Cancer Among Older Adults in New Jersey 1994-1998

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Introduction

In New Jersey and nationally, over half of all newly diagnosed cancers occur in adults aged 65 and older. In New Jersey alone, 64% of men and 58% of women who are newly diagnosed with cancer are aged 65 and older and therefore this age group bears the greatest burden of cancer. This report is designed to examine the rates and trends of cancer among New Jersey's older adults from 1979 through 1998 with special attention to the years 1994 through 1998.

The data are analyzed for three age groups: the "young old", age 65-74, the "older old", age 75-84 and the "oldest old", age 85 and older. Age-specific incidence and mortality rates by gender and race are presented for cancers common in these three age groups. Stage at diagnosis is reported for cancers for which techniques for early detection are available and recommended. Some New Jersey comparisons with national cancer rates in the aging population are also presented.

Older Adults and Cancer

The number and proportion of older adults in the U.S. population, defined as aged 65 and older, are increasing dramatically. According to the 2000 U.S. Census, they currently number about 34.9 million people or 12.4 percent of the U.S. population. By 2030, the proportion of older adults is expected to be 20 percent of the entire U.S. population. Currently, in New Jersey, the proportion is even higher; about 13.2 percent or 1.1 million people are aged 65 and older.

Older adults tend to be a physically and financially vulnerable population, although there is a broad variation in health and economic status. Older adults may have limited access to medical care because of health, social, or income restrictions. This group may therefore receive suboptimal quantity or quality of medical care. Co-existing health conditions, or co-morbidities, create special clinical challenges. However, the evidence is growing that effective treatment strategies leading to improved clinical outcomes in older adults with cancer are possible.

Cancer Incidence and Mortality Among Older Adults

In New Jersey, both incidence and mortality rates for total cancer have been higher for each successive age group. In recent years, incidence rates in the oldest old (age 85 and older) have converged toward the older old (age 75-84) for both men and women. Incidence and mortality rates vary greatly by gender among older adults. Incidence rates for older men are higher than rates for older women, especially for men aged 75 and older. Mortality rates for older men are also higher than rates for older women and share a similar pattern over time.

Stage at Diagnosis Among Older Adults

An early stage at diagnosis is important for predicting a good prognosis and successful treatment of many cancers at any age. A favorable pattern for stage at diagnosis shows a higher proportion of cancer diagnosed as *in situ* or localized. Among older adults in New Jersey, favorable patterns for stage at diagnosis are seen for female breast cancer, prostate cancer and melanoma of the skin, which may be the result of effective screening. Less favorable patterns for stage at diagnosis are seen for cervical, colorectal and oropharyngeal cancers. Better screening efforts among older adults and their physicians may increase the detection of these cancers at an earlier stage.

A Comparison of New Jersey and U.S. Older Adults

Cancer incidence and mortality rates for older adults in New Jersey and the U.S. were compared by site, gender, and race for the time period 1994 through 1998. New Jersey incidence rates for men and women age 65 and older were generally higher than those of the total U.S. However, lower incidence rates were seen for leukemia, multiple myeloma and oropharyngeal cancers compared with the U.S. Lower overall mortality rates are seen among older black men in New Jersey compared with the U.S. Some lower mortality rates are also seen in New Jersey with lung, cervical, uterine, multiple myeloma and pancreatic cancers for various age groups, genders and races compared with the U.S.

Conclusion

With the rising number and proportion of older adults with cancer in New Jersey over the coming decades, attention should be given to interventions that will decrease the burden of cancer among adults age 65 and older. There are many needs and opportunities for research to understand the issues of early diagnosis, treatment and support of older adults with cancer. Data from the New Jersey State Cancer Registry (NJSCR) may provide researchers with important tools to address these issues.

INTRODUCTION

The number and proportion of older adults in the U.S. population, defined as age 65 and older, are increasing dramatically. According to the 2000 U.S. Census they currently number about 34.9 million people or 12.4 percent of the U.S. population. By 2030, the proportion of older adults is expected to be 20 percent of the entire U.S. population (Yancik and Ries, 2000). Currently, in New Jersey, the proportion is even higher than for the U.S.; about 13.2 percent or 1.1 million people are age 65 or older. Sixty-five years of age has been the traditional age of entry into various social, economic and medical entitlement programs and therefore defines the start of this age group of older adults.

Older adults tend to be a physically and financially vulnerable population, although there is broad variation in health and economic status. Older adults may have limited access to medical care because of health, social or income restrictions and may therefore receive suboptimal quantity or quality of medical care. Co-existing health conditions, or co-morbidities, create special clinical challenges and tend to limit treatment options for the older cancer patient (Yancik, Wesley, Ries, Havlik, Edward and Yates, 2001). A paucity of data on older adults with cancer and bias about the frail elderly has exacerbated this situation (Balducci, 2001). But regardless of their health status, older cancer patients today are still less likely to receive optimal care consistent with medical guidelines, and are under-represented in clinical trials that test improvements in cancer treatment (Yancik and Ries, 1994). In addition, palliative care and supportive services, especially in older adults, are not standardized and not widely applied. Pain in older adults is less likely to be well managed and under-prescribing of analgesics is common. Furthermore, decision-making involving end-of-life issues for older adults is complicated, especially when dealing with such problems as cognitive impairment, complex family interactions and psychosocial concerns (Weinstein, 2001; Balducci and Extermann, 1999).

In the context of current demographic and health trends, there is considerable interest in the potential for early detection and prevention of cancer in older adults. In New Jersey, the *Task Force on Cancer Prevention, Early Detection and Treatment*, is establishing goals to "increase the use of screening tests for cancer especially among the elderly and minority populations". Early detection and prevention programs are often targeted at younger age groups, even when most cancers are diagnosed in persons aged 65 and older. Research has shown that older women, especially older minority women, remain underrepresented among those participating in screening programs (Mandelblatt and Yabroff, 2000). Physicians are less likely to offer screening tests to older women compared with their younger patients. Early diagnosis is important for older adults because it increases the likelihood of improved outcome for those who have co-existing medical conditions, or for those who are otherwise healthy.

At the same time, evidence is growing that effective treatment strategies and improved clinical outcomes in older adults with cancer are possible. Recent studies have shown that older patients with cancer, especially those with non-Hodgkin's lymphoma and cancers of the breast, colon and lung, can receive as aggressive treatments as younger adult patients with no worse outcomes when a patient's comorbidity status permits such treatment (Carlson, 2001; Balducci, 2001).

It appears that chronological age by itself is less of a factor in determining patient outcomes than other related factors such as functional status, co-morbidities, and overall health status. Because of the heterogeneity in health and economic status of our aging population, comprehensive assessments and individualized management may be of significant value in improving survival of and quality of life in older adults with cancer.

Cancer Among Older Adults in New Jersey 1994-1998, is one of a series of reports produced by the New Jersey Department of Health & Senior Services, Cancer Epidemiology Services that focuses on a specific type of cancer or population group. For this report, the rates and trends of cancer among New Jersey residents aged 65 and older are presented. In New Jersey and nationally, over half of all newly diagnosed cancers occur in this age group.

For the purpose of this report, older adults are defined as age 65 and older. The data are analyzed for three age groups: the "young old", age 65-74, the "older old", age 75-84 and the "oldest old", age 85 and older. Age-specific incidence and mortality rates by gender and race are presented for cancers common in these three age groups. Stage at diagnosis is also reported for cancers with available screening tests and recommendations. Limited comparisons to national cancer rates in the aging population are also presented.

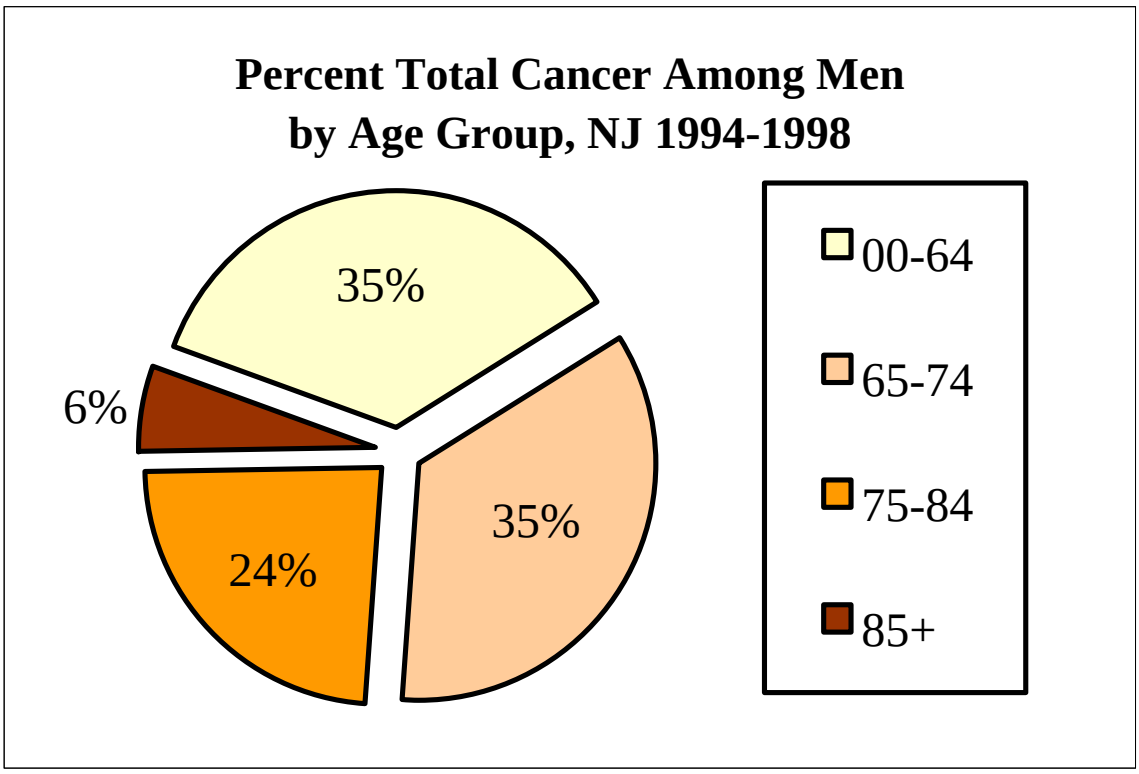
IMPACT OF CANCER ON THE OLDER ADULT POPULATION

Due to the anticipated growth in the number and proportion of adults in the U.S. and New Jersey who will be age 65 years and older in the coming decades, and because of substantial increases in life expectancy, the proportion of all cancers among older adults is likely to increase. Those age 85 and older are the fastest growing segment of this population (see Appendix Figure 1).

New Jersey has addressed the impact of cancer in its publication of *Healthy New Jersey, 2010.* This document sets objectives for the state with specific targets to reduce cancer incidence and mortality and improve stage of disease at diagnosis. Within some of these objectives are targets set specifically for adults age 65 and older.

In New Jersey, 64% of men and 58% of women who are newly diagnosed with cancer are age 65 and older (see Figures 1a and 1b). Based on the population projection (assuming constant age-specific rates of cancer), we can expect the number of newly diagnosed cancers to increase. The increase will affect almost every age and gender group among older adults. In light of these data, there is a need to expand our cancer prevention and control efforts in these age groups that bear the greatest burden of cancer.

Figure 1a.



Percentages are rounded (see Appendix Table 1).

Figure 1a represents the impact of all invasive cancer among men age 65 and older compared with those men less than 65 years of age. The proportion of incident cancer cases among older adult men is further divided among the young old (65-74), the older old (75-84) and the oldest old (85 and older). Men aged 65-74 have about as high a proportion of total cancer as all those below age 65 combined. Because of the high incidence of prostate cancer, older New Jersey men bear a greater burden of incident cancer cases than do older women.

Figure 1b.

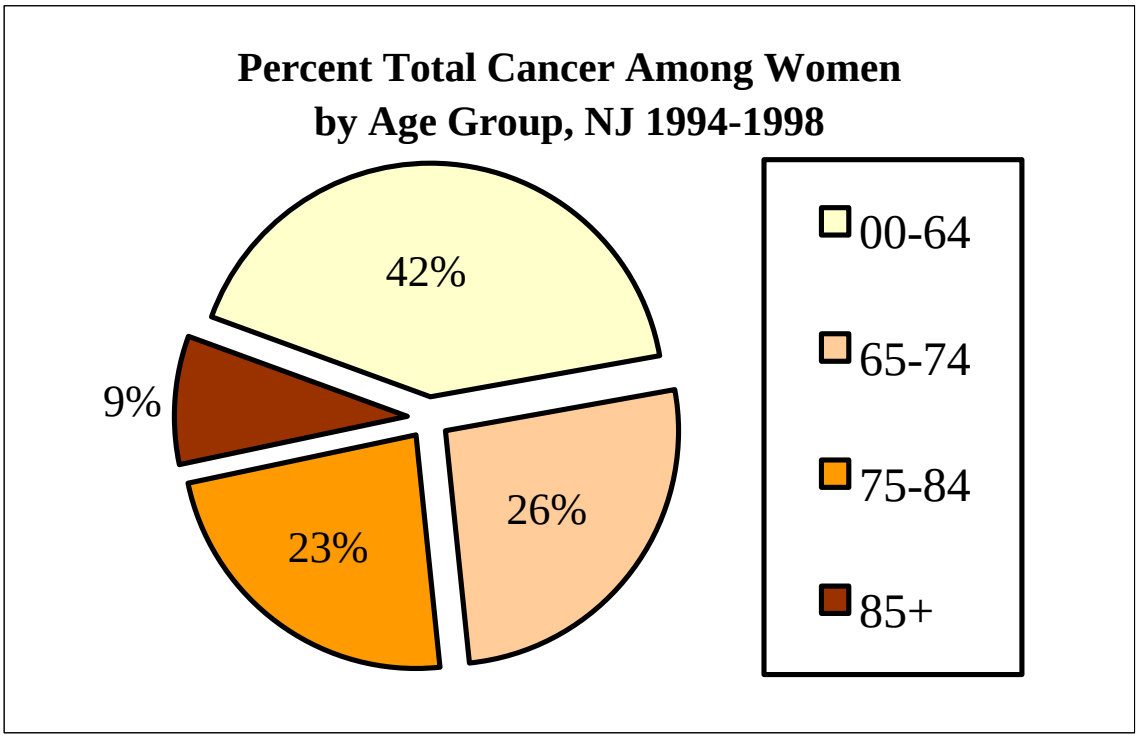


Figure 1b highlights the magnitude of total cancer incidence among women age 65 and older compared with women under 65. The proportion of cancer among women aged 65-74 is very similar to that of women aged 75-84, reflecting a growing population of older adult women. The proportion of total cancer for women age 65 and older is less than that for men of the same age group. This is primarily due to slightly higher breast cancer incidence among women under the age of 65. It is likely that, as New Jersey's population continues to age, the number of incident cases will increase, especially for those cancers typically diagnosed among older adults such as cancers of the colon, prostate, pancreas and lung.

AGE-SPECIFIC TRENDS IN TOTAL CANCER INCIDENCE & MORTALITY AMONG OLDER ADULTS, 1979-1998

In New Jersey, both incidence and mortality rates for total cancer have been higher for each successive age group (Figures 2-4). However, in recent years, incidence rates in the oldest old (age 85 and older) have converged toward the older old (age 75-84) for both men and women.

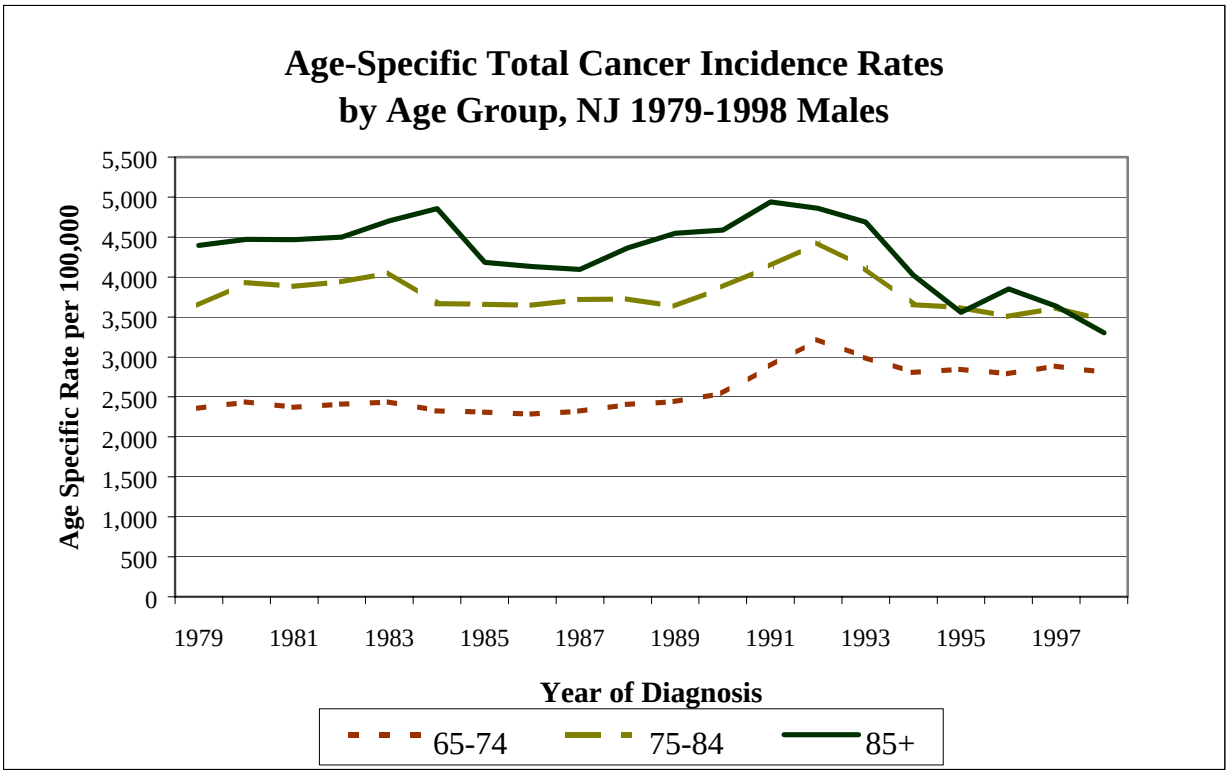
Trends in total cancer incidence rates among men vary by age group. The peak in incidence for all age groups in 1992 was due to increased screening for prostate cancer. This mirrors time trends for all ages combined. Since then, incidence rates have declined and appear to level off for the young old, age 65-74 and the older old, age 75-84. The decline continues for the oldest old, age 85 and older, and appears to converge with the rates for the older old. The decline in cancer incidence rates among men 85 and older is likely due to declines in prostate and colorectal cancer incidence rates as indicated by data presented later in this report.

Among women, incidence rates have increased over time for all age groups, but less dramatically than for men. In recent years, the incidence rate for women 85 and older also appears to be converging to that of the next younger age group. The decline in cancer incidence rates among women 85 and older may be attributed to declines in uterine and colorectal cancer rates as indicated by data presented later in this report.

The trends for total cancer mortality for older adults have changed little from 1979-1998 (Figures 4-5). As with incidence, mortality rates are higher for men than women in every age group and the age differential for mortality is larger among men than women. Since the early to mid-1990's, there has been a slight decline in cancer mortality rates among men in all age groups which is likely due to decreases in prostate and colorectal deaths. For women, a slight decline in mortality during this same time period is noted only for women age 85 and older.

These figures demonstrate the difference in the impact of cancer by gender. Older men experience higher incidence and mortality rates than older women. Also, looking at total cancer rates can mask underlying patterns of specific cancers. Each cancer is a different disease with different incidence and mortality patterns, causes and risk factors. In the following section, we examine 16 different cancers that influence total cancer rates among older adults.

Figure 2.



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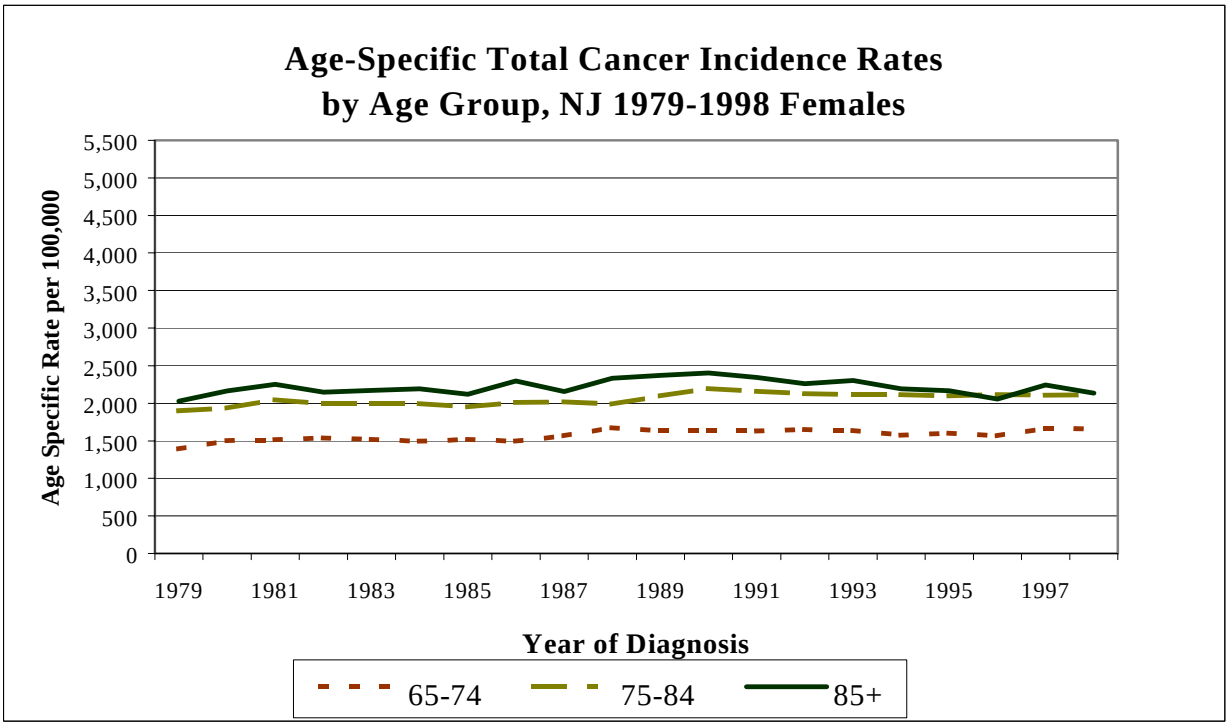

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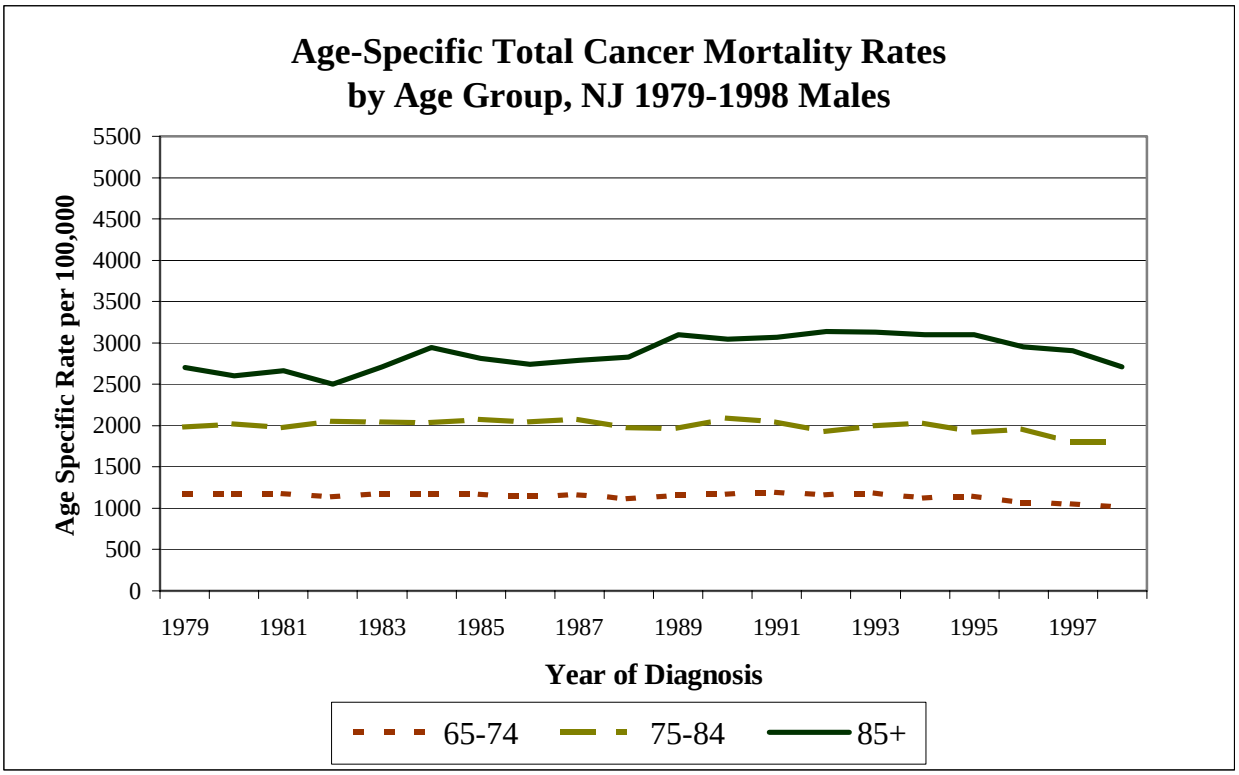

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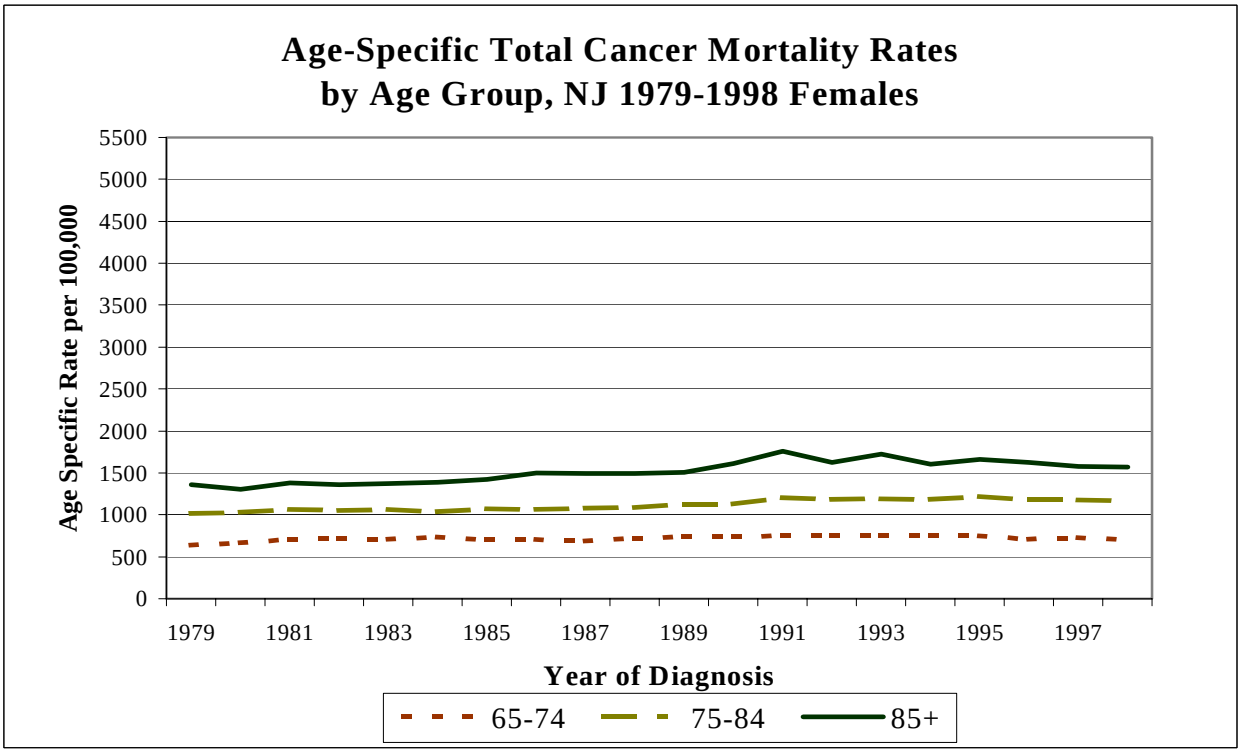


AGE-SPECIFIC CANCER INCIDENCE AND MORTALITY RATES AMONG OLDER ADULTS BY SITE, 1994-1998

This section shows patterns in cancer incidence and mortality rates by site for the period 1994-1998. Cancer data for 1999, although available, were still considered preliminary when this report was generated and were not included. As illustrated in the first section, incidence rates for the oldest two age groups have recently converged for both older men and women. Using our most recent data, patterns of incidence and mortality are displayed by gender, race and age group among older adults.

It should be noted that displaying incidence and mortality data for the same time period has some drawbacks because these data do not represent the same population. It is possible to see higher mortality rates than incidence rates for a certain cancer site. Possible reasons why this could occur include: 1) mortality rates increasing faster than incidence rates; 2) difference in time between diagnosis and death by site; 3) vagueness of mortality data acquired from death certificates; or, 4) unstable rates due to small numbers (such a pattern is especially noted below for multiple myeloma and for ill-defined and unspecified cancers).

Total Cancer (Figures 6-7): Incidence rates for all cancers combined are at least 50 percent higher among older men compared with older women. Incidence rates increase with advancing age for all race and gender groups with the exception of black men. Older black men aged 75-84 have the highest total cancer incidence rate. Incidence rates are generally higher among black men than white men and lower among black women compared with white women.

There is a clear age-related increase in mortality rates for all race and gender groups. Consistent with incidence patterns, men have substantially higher mortality rates in each age group compared with women. Blacks of both genders have higher mortality rates than whites. In contrast to incidence rates, the mortality rates were somewhat higher for black women compared with white women. This may be due in part to breast cancer mortality, which is presented in more detail later in this report.

Oropharyngeal (Figures 8-9): Among older men, the annual average number of incident cases of oropharyngeal cancer is somewhat less than that for men under age 65 while for older women, it is slightly more than that for women under age 65. Incidence and mortality rates are higher among men than among women and are highest among the oldest old, age 85 and older. Small numbers preclude showing rates by race.

Stomach (Figures 10-11): Stomach cancer incidence and mortality rates increase with advancing age and are higher among blacks than among whites. Among older men, the annual average number of incident cases is close to double that for men under age 65 and for older women, it is more than double that for women under age 65. Patterns among women mirror that of men but at a lower rate.

Colorectal (Figures 12-13): For older men and women, the annual average number of incident cases is more than double that for adults under age 65. Incidence rates for colorectal cancer are similar among whites and blacks in the 65-74 age group but higher among whites than blacks in the two older age groups for both genders. But among black men, the highest incidence rate is again seen for those aged 75-84. Mortality rates, however, are nearly the same among black and white men. Black women have slightly higher age-specific mortality rates than their white counterparts.

Pancreas (Figures 14-15): Among older men, the annual average number of incident cases is close to double that for men under age 65 and for older women, it is more than double that for women under age 65. Pancreatic cancer incidence increases with age for all race and gender subgroups except for black men where the 65-74 year olds experience a higher rate than the 75-84 year olds. Mortality rates nearly equal incidence rates primarily due to the high fatality rate for this cancer. Because of small numbers of cases among blacks, the age-specific incidence and mortality rates are unstable, but generally appear to be increasing with age.

Lung (Figures 16-17): Lung cancer incidence rates are higher for men than women. Among older men, the annual average number of incident cases is close to double that for men under age 65, and for older women, it is more than triple that for women under age 65. Lung cancer incidence peaks in the 75-84 age group among all races and genders. While black men have higher incidence rates than white men aged 65-84, incidence rates are lower among black women compared with white women in this same age grouping. Lung cancer is the number one cause of cancer death among all older men and women except for adults aged 85 and older. For men, lung cancer mortality increases with advancing age. However, women aged 75-84 have the highest mortality rates for this cancer.

Melanoma of the Skin (Figures 18-19): Incidence and mortality rates are presented here for whites only since over 90 percent of cases of malignant melanoma of the skin are diagnosed among whites. The annual average number of incident cases among older men and women is similar to that for men and women under age 65. Among men, incidence rates are almost the same for those aged 75-84 and those 85 and older. Melanoma incidence rates increase with advancing age among women. Mortality rates for both genders increase with age with higher rates among men than women.

Female Breast (Figures 20-21): For breast cancers among women age 65 and older, the annual average number of incident cases is somewhat less than that for women under age 65. Breast cancer incidence rates are highest among older women aged 75-84 and are much higher among white women compared with black women. Breast cancer mortality rates increase with increasing age. Black women have slightly higher rates in each age group than white women.

Cervical (Figures 22-23): Invasive cervical cancer is not a very common cancer in women age 65 and older however, with the use of the Pap test, this cancer is preventable. Incidence rates in older women are the highest among women aged 75-84. Cervical cancer incidence is twice as high among black women than among white women. Mortality rates increase with age and are at least twice as high among black women compared with white women.

Uterine (Figures 24-25): For uterine cancers among women age 65 and older, the annual average number of incident cases is slightly higher than that for women under age 65. Incidence rates for this cancer decrease with age with the exception of black women aged 75-84, where incidence rates are higher than black women aged 65-74. Overall incidence rates are higher among black women in the oldest two age groups than among white women. Mortality rates are higher among blacks than whites in all age groups. Mortality rates are highest in the 75-84 age group for all races.

Ovarian (Figures 26-27): The annual average number of incident cases of ovarian cancer among older women is similar to that for women under age 65. Ovarian cancer incidence is highest among women aged 75-84 and higher among whites compared with blacks. Mortality rates are also higher among white women than black women and tend to increase with advancing age.

Prostate (Figures 28-29): Prostate cancer is the most common cancer among men age 65 and older. Seventy three percent of prostate cancer incidence and 92% of prostate cancer deaths in New Jersey occur in men from this age group. Prostate cancer incidence and mortality rates are much higher among black men of all ages compared with white men. The peak incidence rates among older men occur among 75-84 year old men. By contrast, mortality due to prostate cancer increases with increasing age. The comparatively low mortality rates from prostate cancer indicate a relatively good prognosis from this disease.

Bladder (Figures 30-31): Among older men, the annual average number of incident cases is more than double that for men under age 65 and for older women, it is more than triple that of women under age 65. Incidence rates increase with advancing age for all genders and race subgroups among older adults except for black men where incidence rates are slightly higher for those aged 75-84. White men have the highest incidence rates compared with any other population subgroup with rates about twice that of black men. Incidence rates for white men are about four times higher than that of white women and about five to six times higher than that of black women. Patterns of mortality generally follow incidence rates.

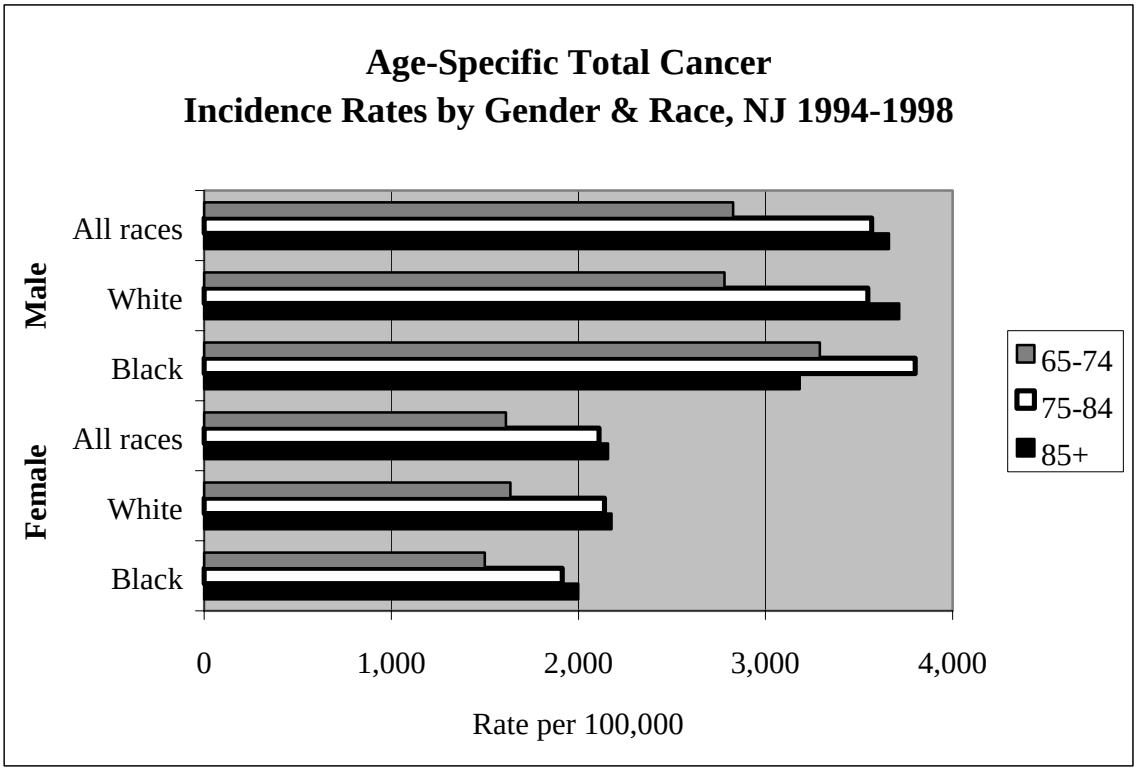
Non-Hodgkin's Lymphoma (NHL) (Figures 32-33): Among older men, the annual average number of incident cases of NHL is similar to that for men under age 65 while for older women, it is slightly higher than for women under age 65. Incidence and mortality rates are higher among whites than blacks, in general, and were higher in men compared with women. The highest incidence of NHL occurs in the 75-84 age group for white women, but in the 85 and older age group for white men. Mortality rates generally increase with advancing age.

Multiple Myeloma (Figures 34-35): The incidence of multiple myeloma is lower than most of the other cancer sites included in this report. However, about 70% of multiple myeloma cases are diagnosed in adults aged 65 and older. Incidence rates are higher for men compared with women and incidence rates among blacks are about double those for whites. Overall, incidence rates increase with advancing age except for black males, among whom incidence rates are highest for those aged 75-84. Patterns of mortality generally follow incidence rates, but for this cancer mortality patterns are different and may be the result of several factors addressed on page 10.

Leukemia (Figures 36-37): The annual average number of incident cases of leukemia among men and women age 65 and older is slightly higher than for those under age 65. Incidence rates of leukemia are higher among men than women and among whites than blacks. Both incidence and mortality rates increase with advancing age in this population. Mortality rates from leukemia are similar to the incidence rates, indicating the poor prognosis from this disease in older adults.

Ill-defined and Unspecified Sites (Figures 38-39): Over two-thirds of persons diagnosed with ill-defined and unspecified site were age 65 and older. A cancer is categorized as ill-defined or unspecified when the physician is unable to determine the primary site of origin either due to the complexity of the case, sudden death, or patient refusal of further diagnostic work-up. For these sites, incidence and mortality rates increase with advancing age for both men and women. Mortality rates for white males, age 85 and older, are higher than black males in this age group.

Figure 6.



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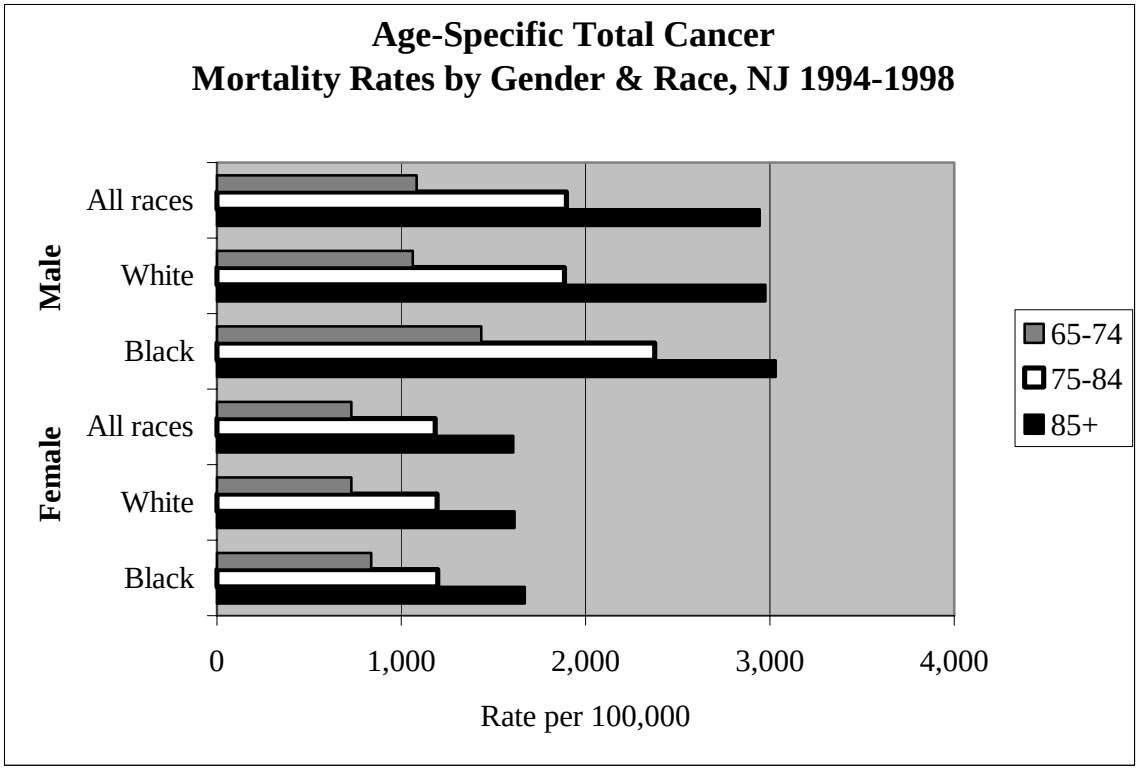

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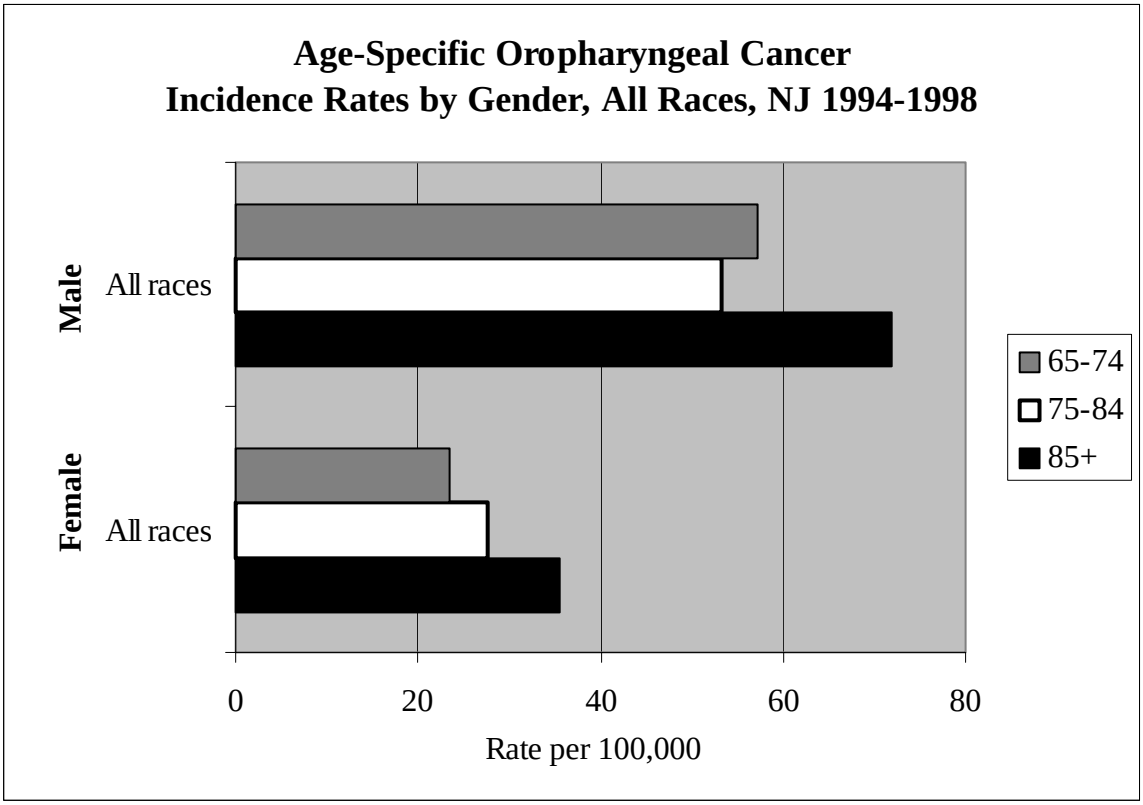

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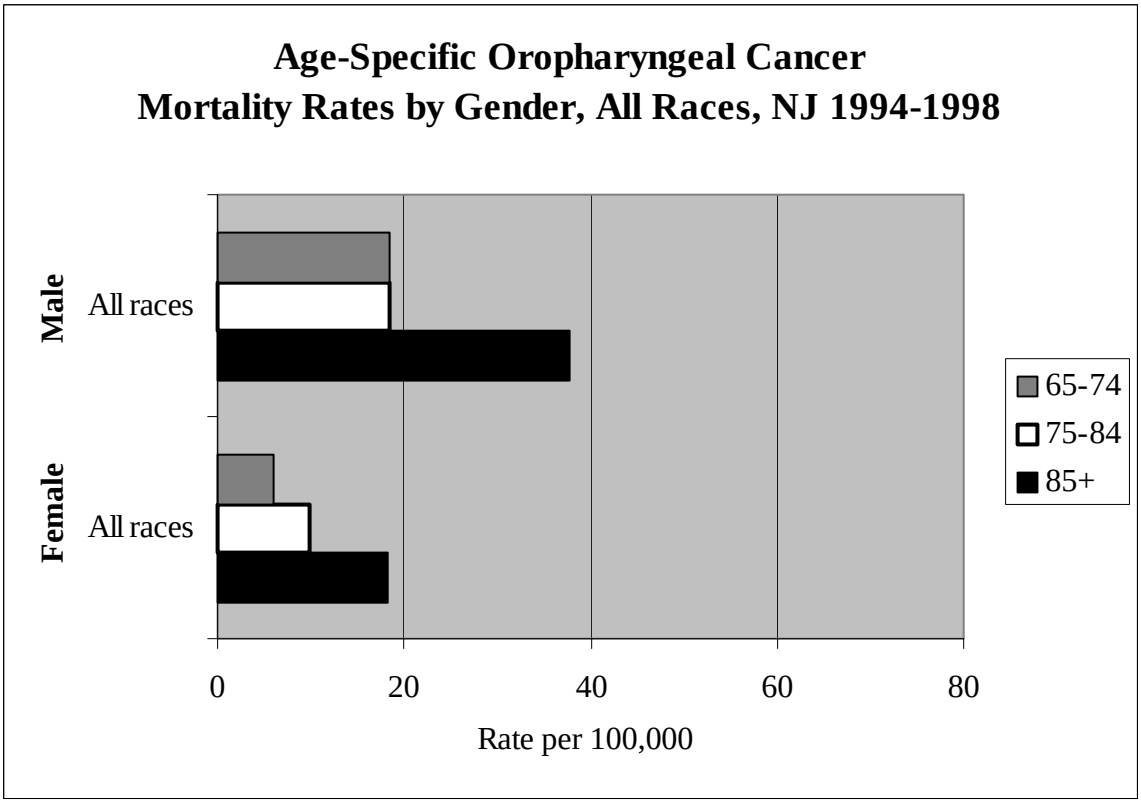

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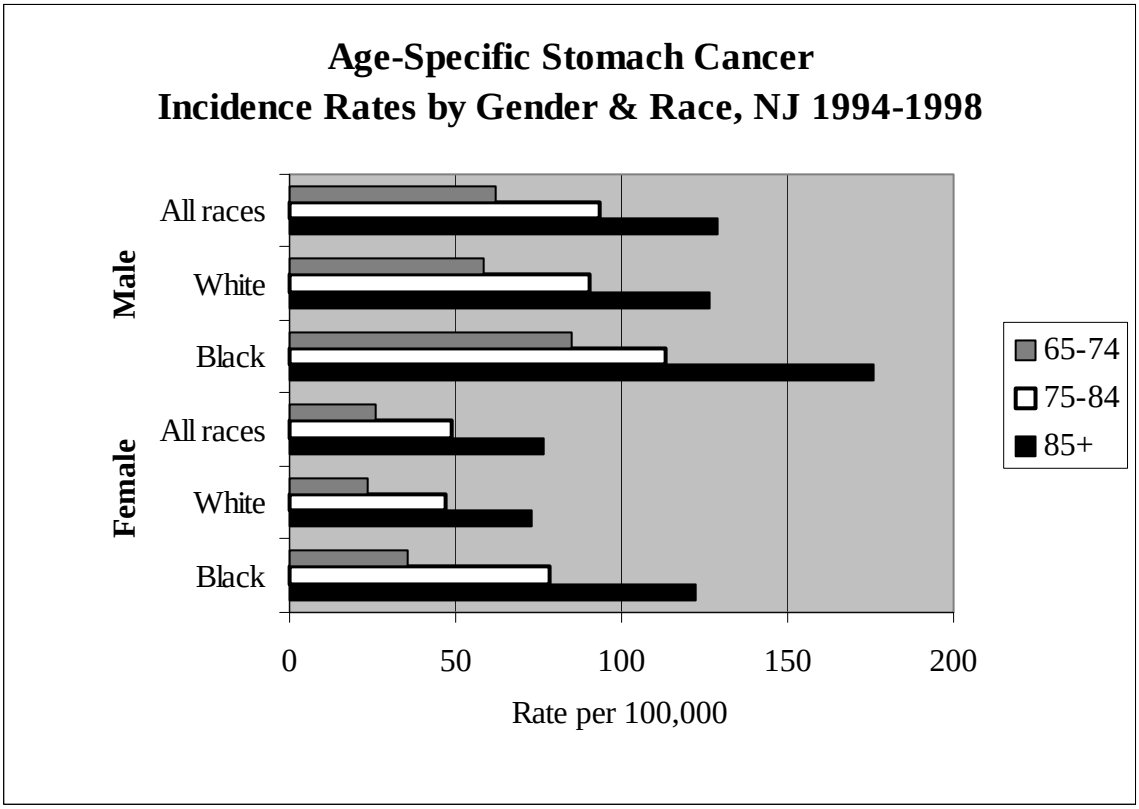

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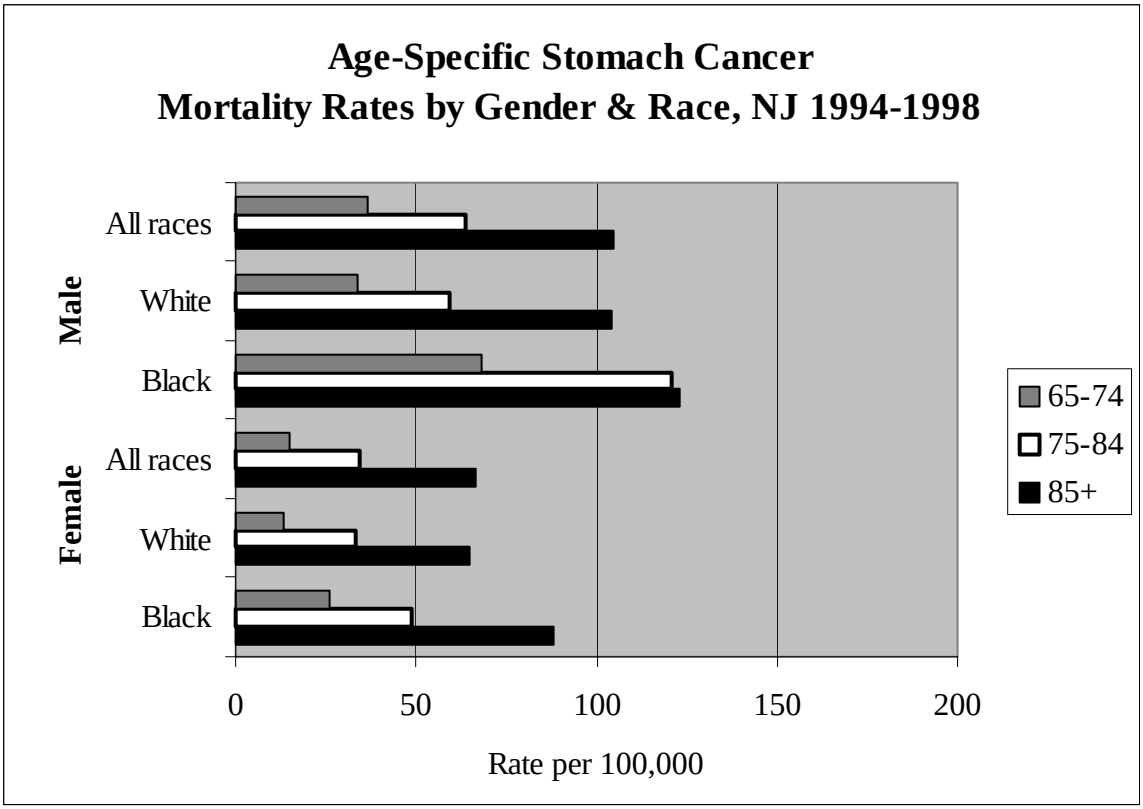

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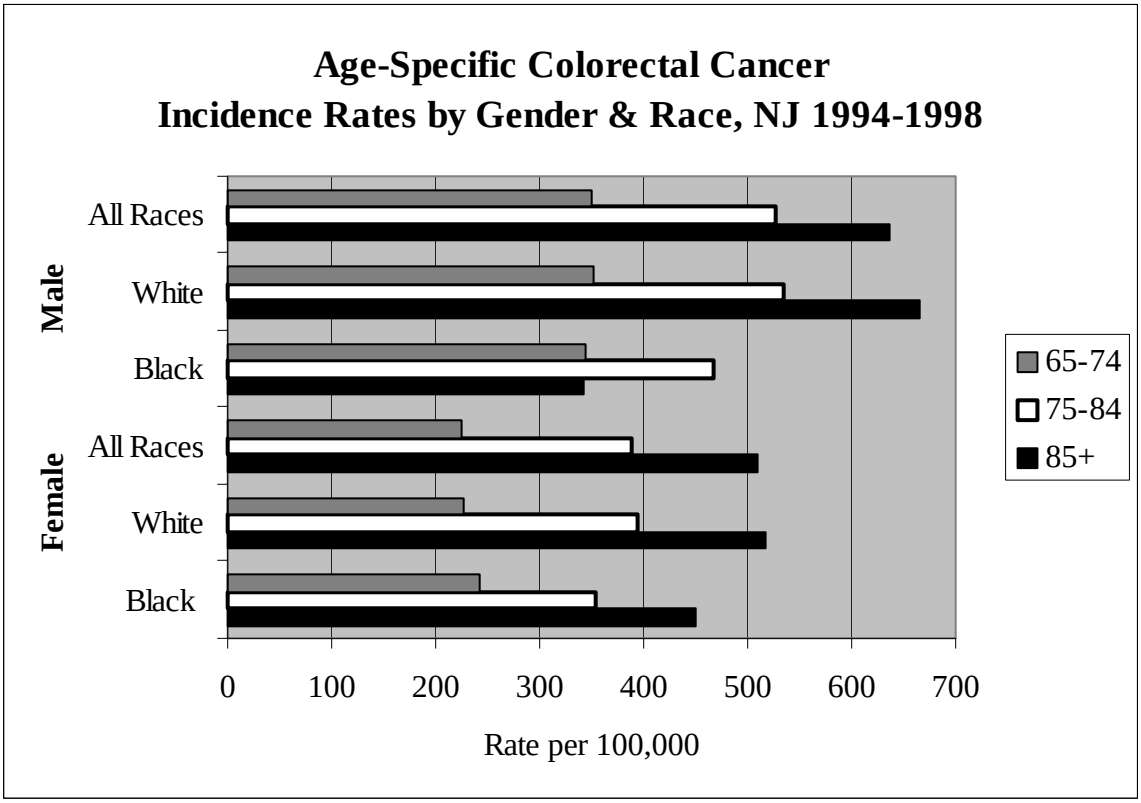

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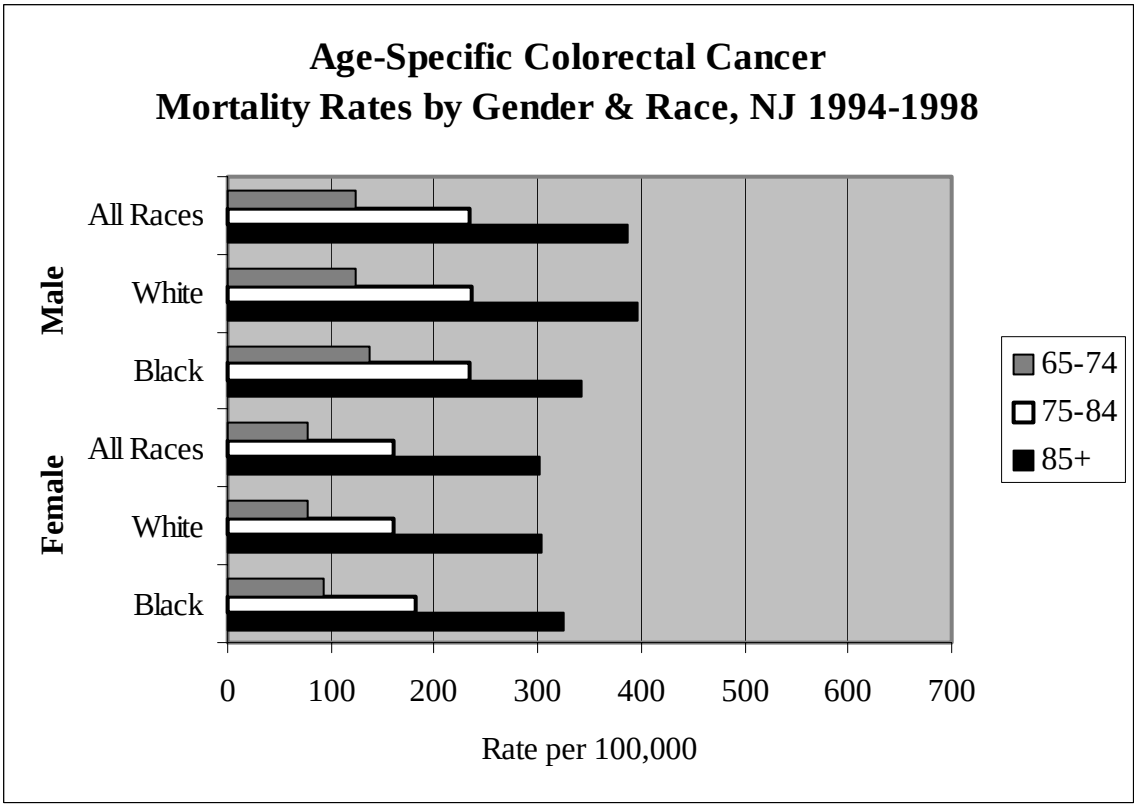

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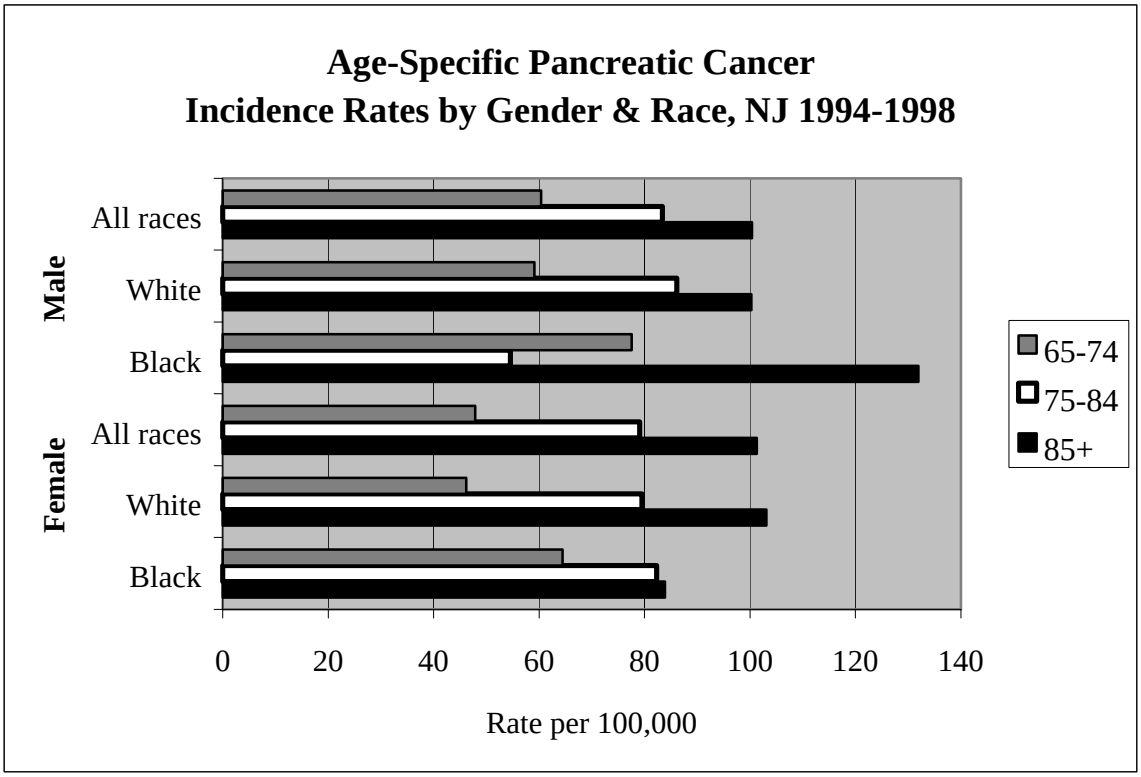

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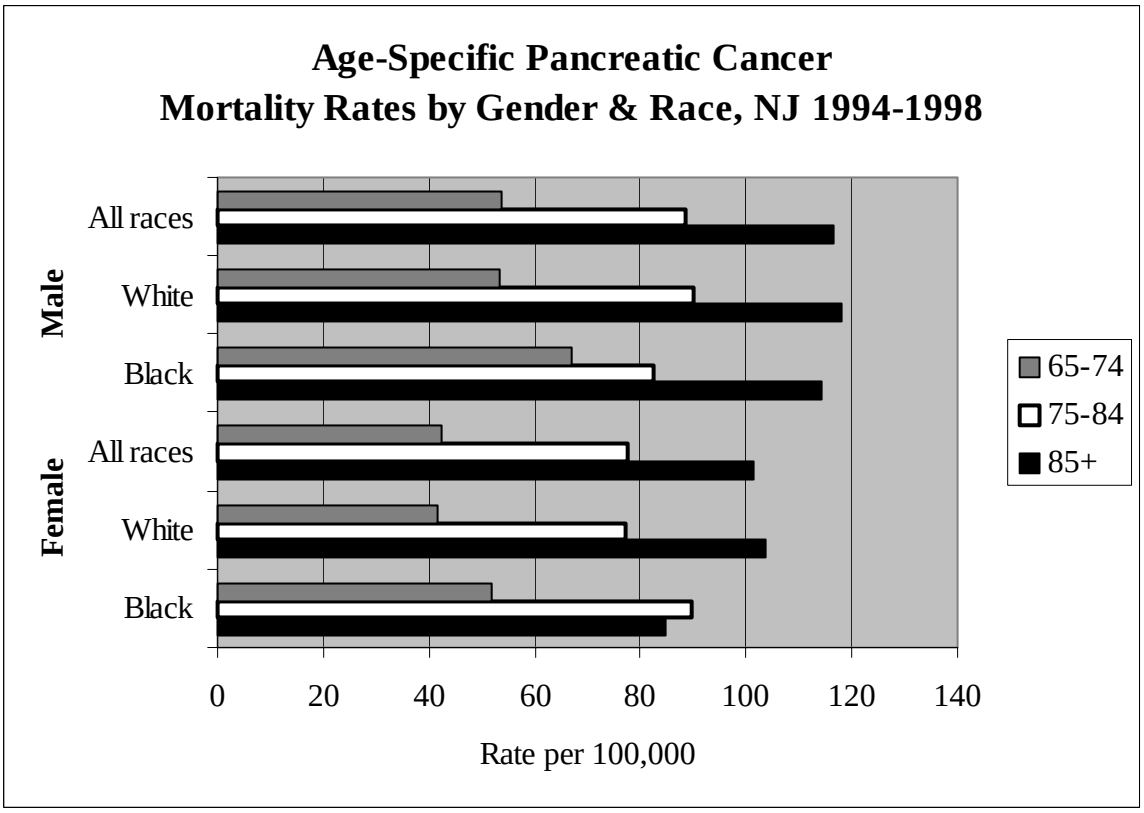

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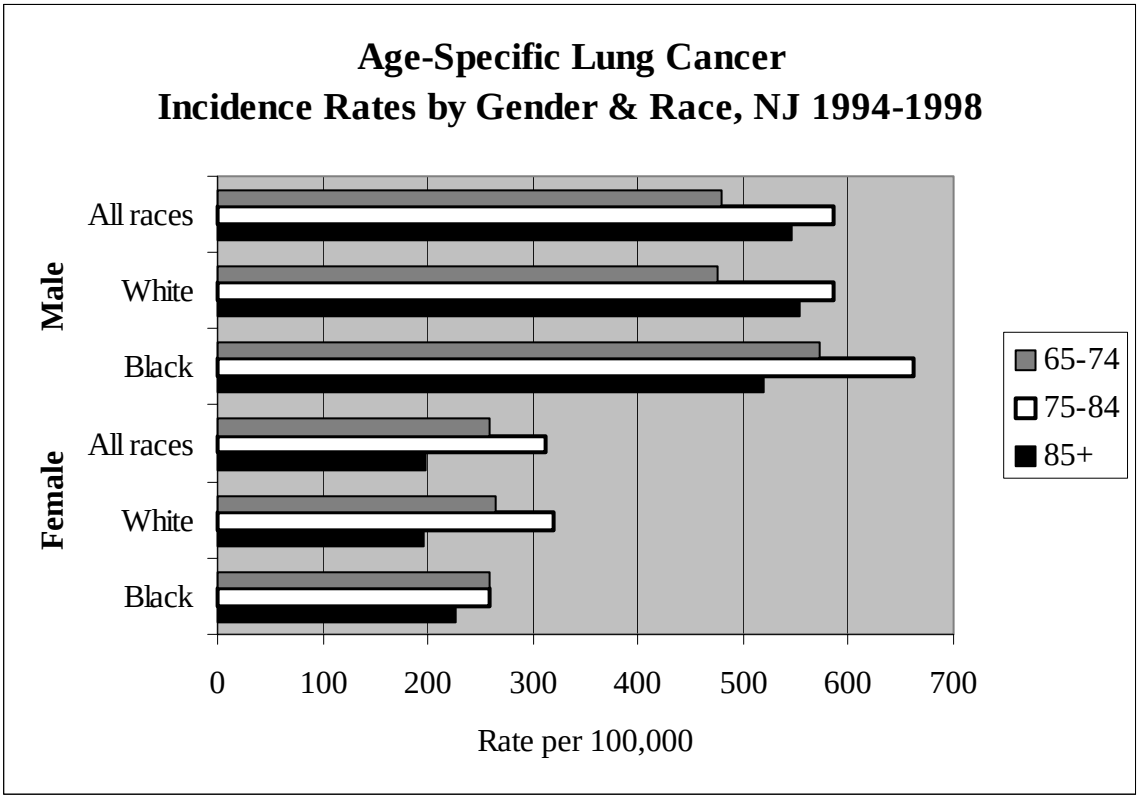

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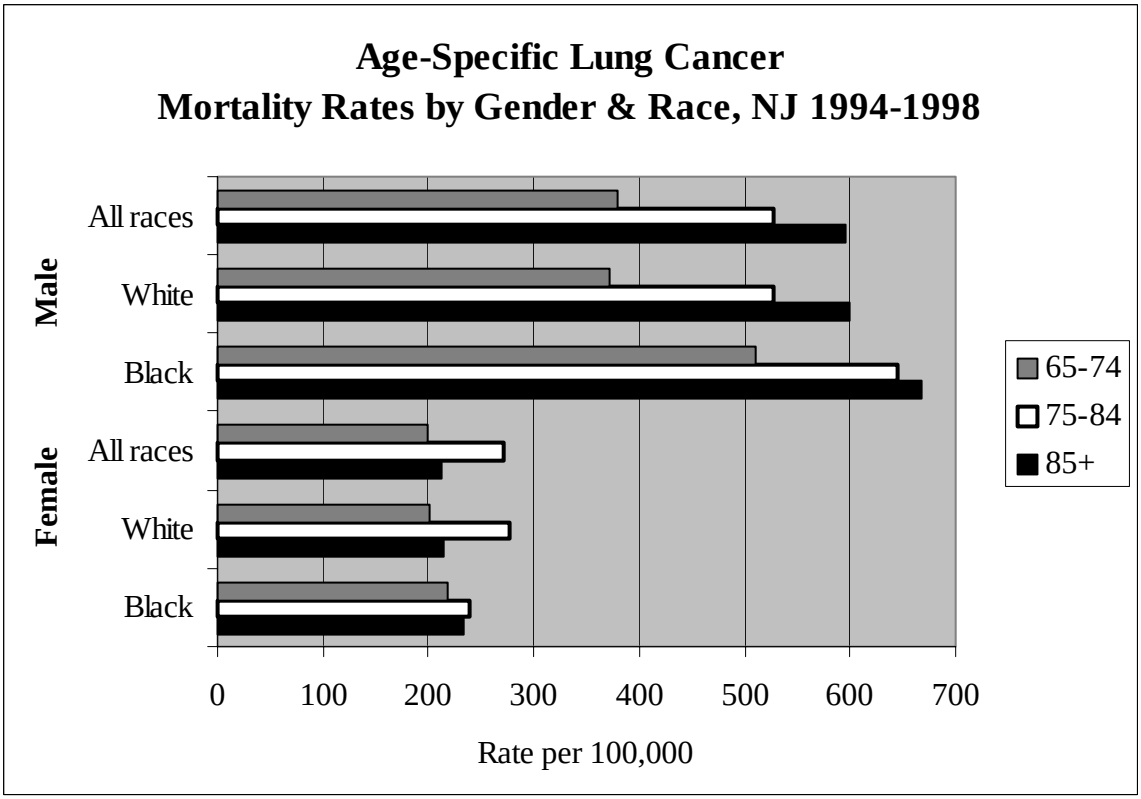

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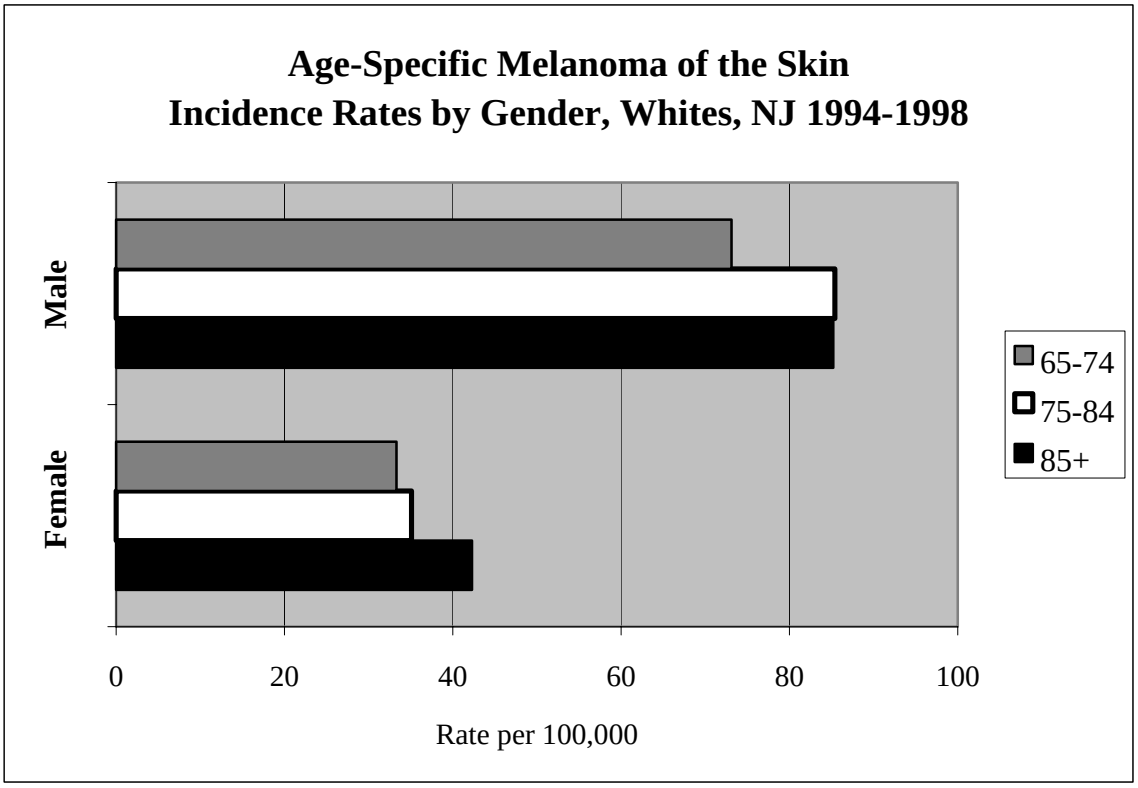

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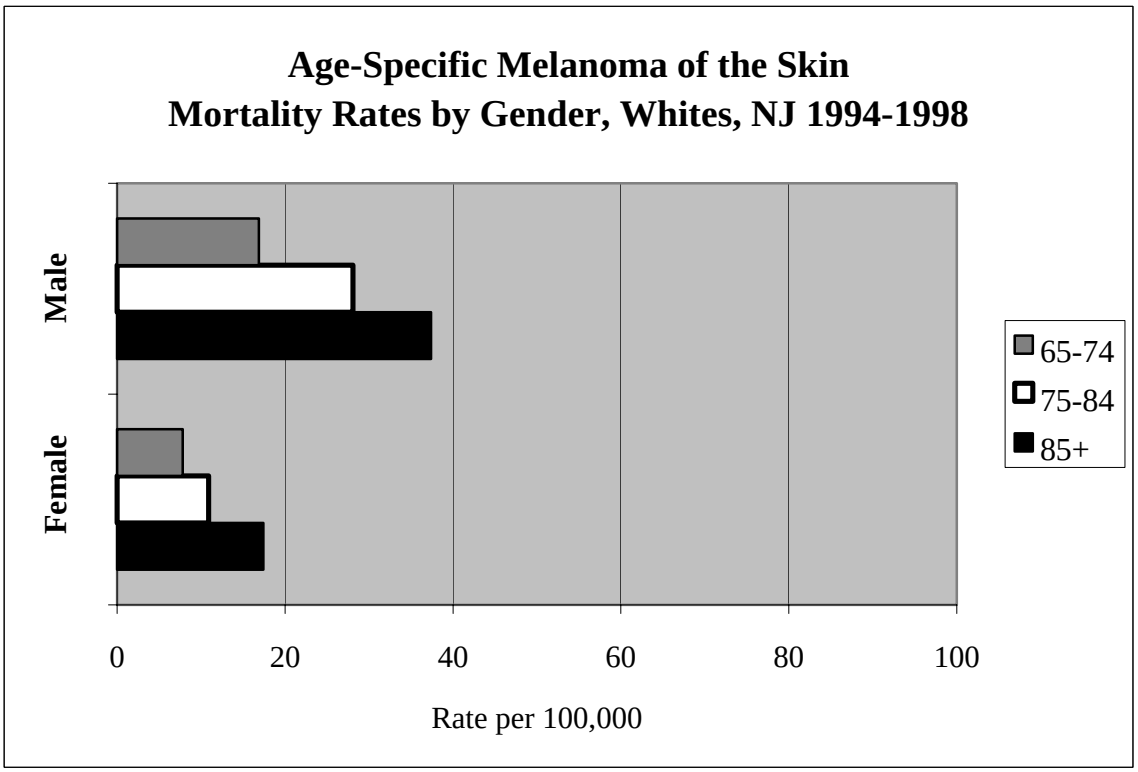

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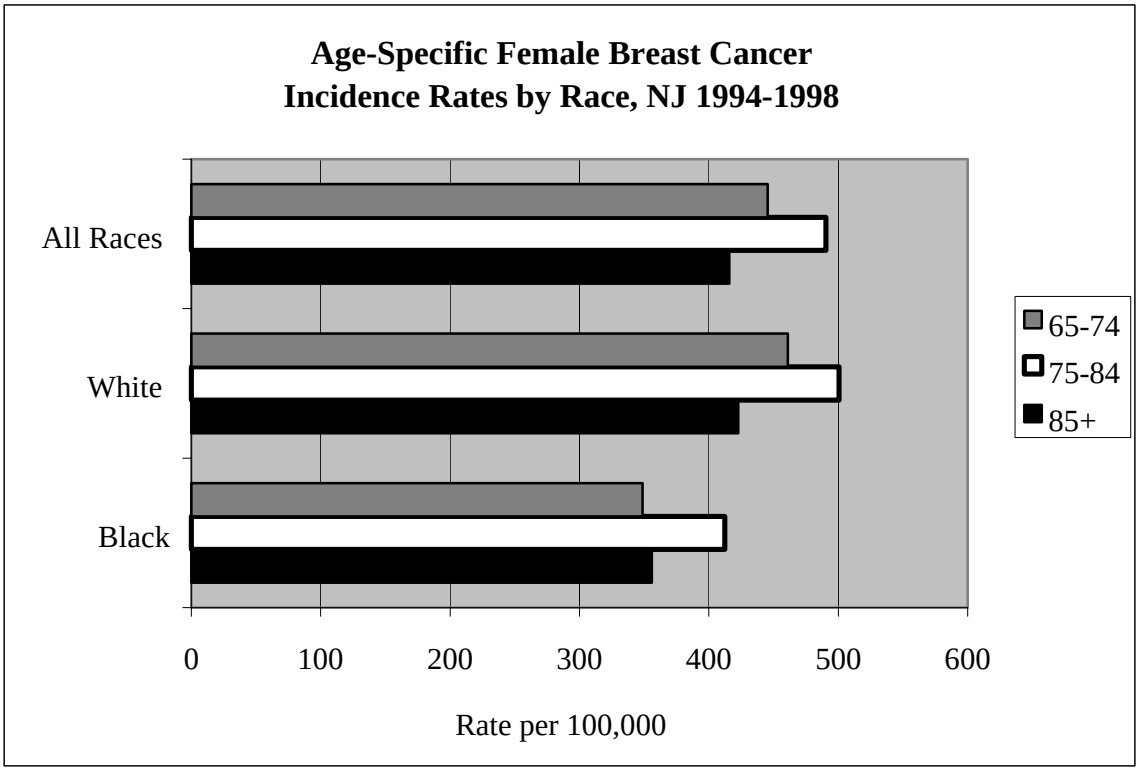

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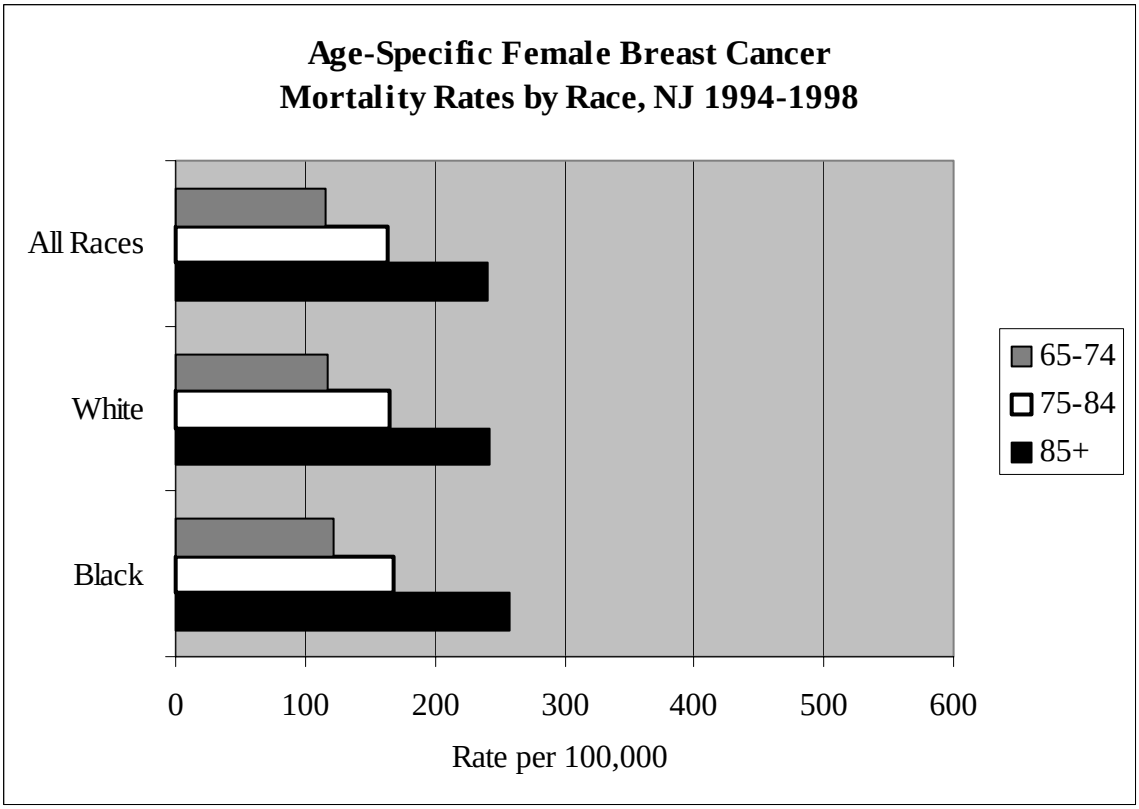

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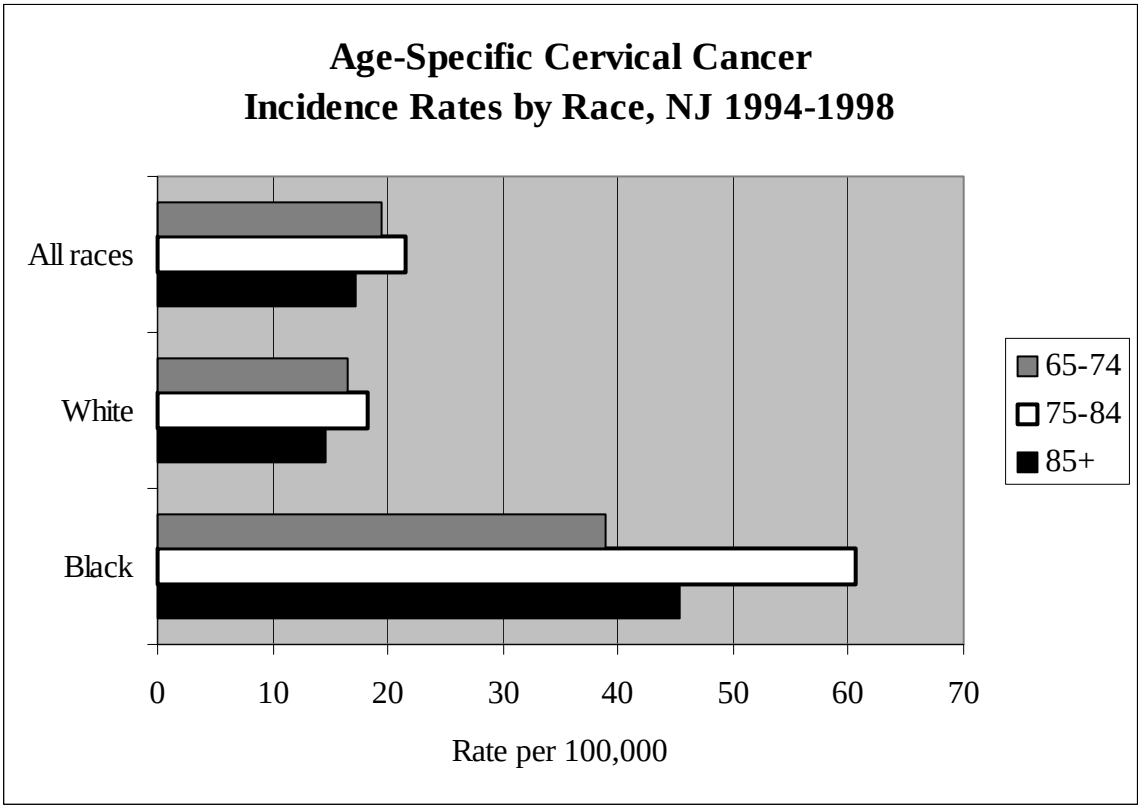

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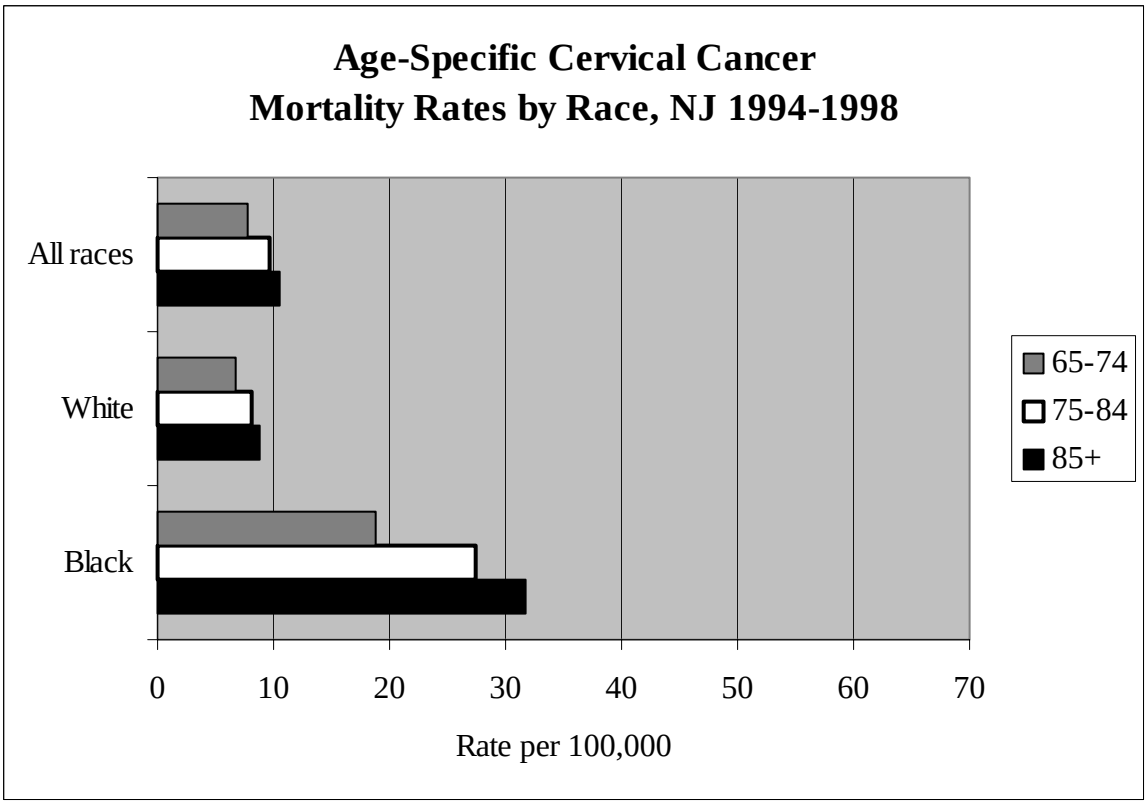

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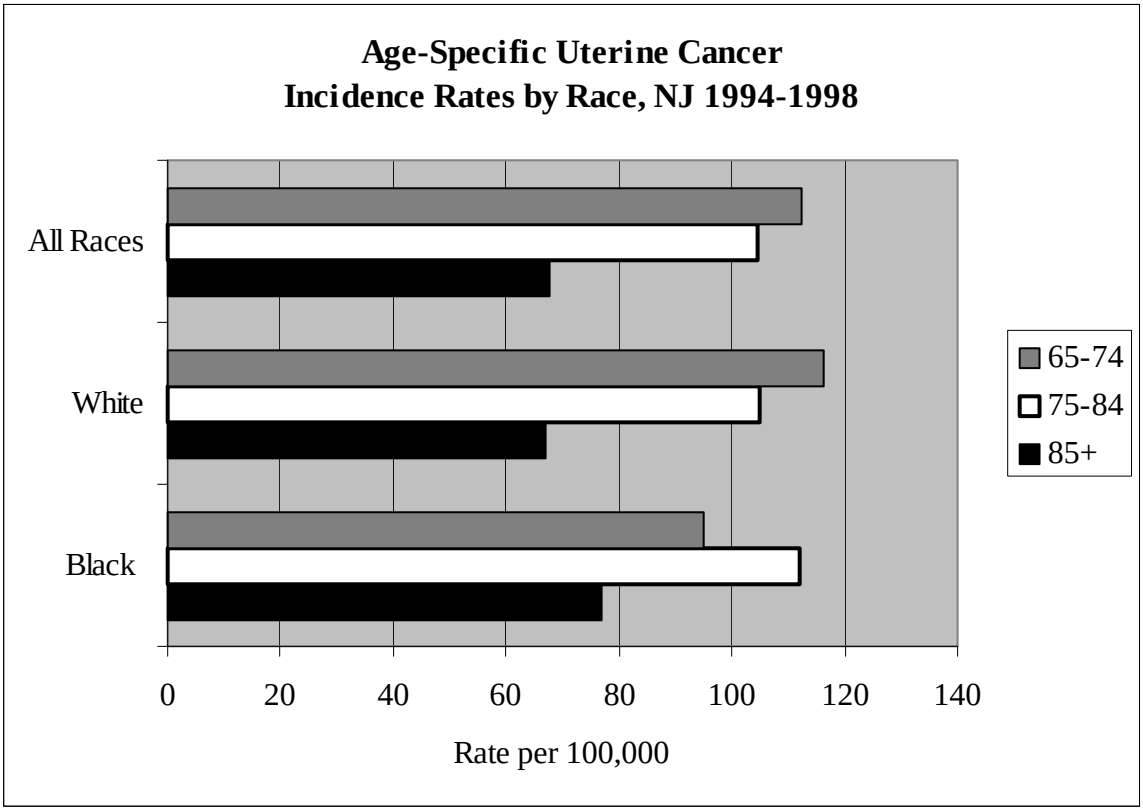

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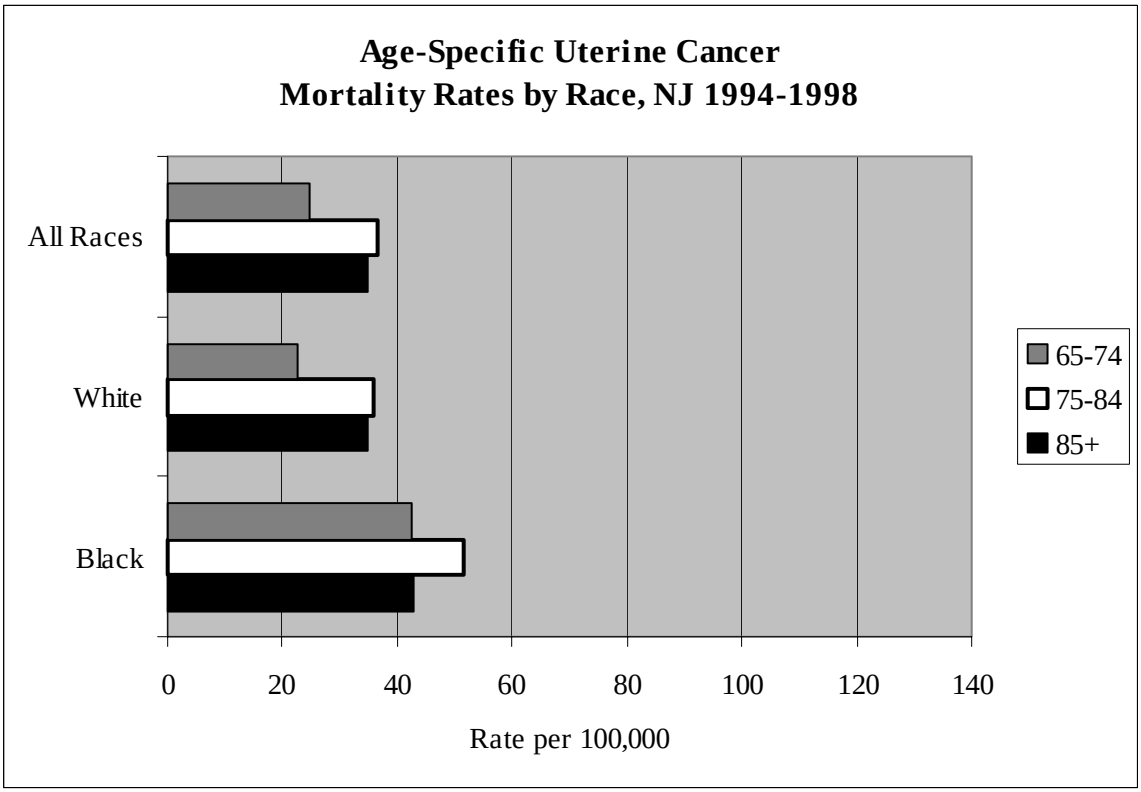

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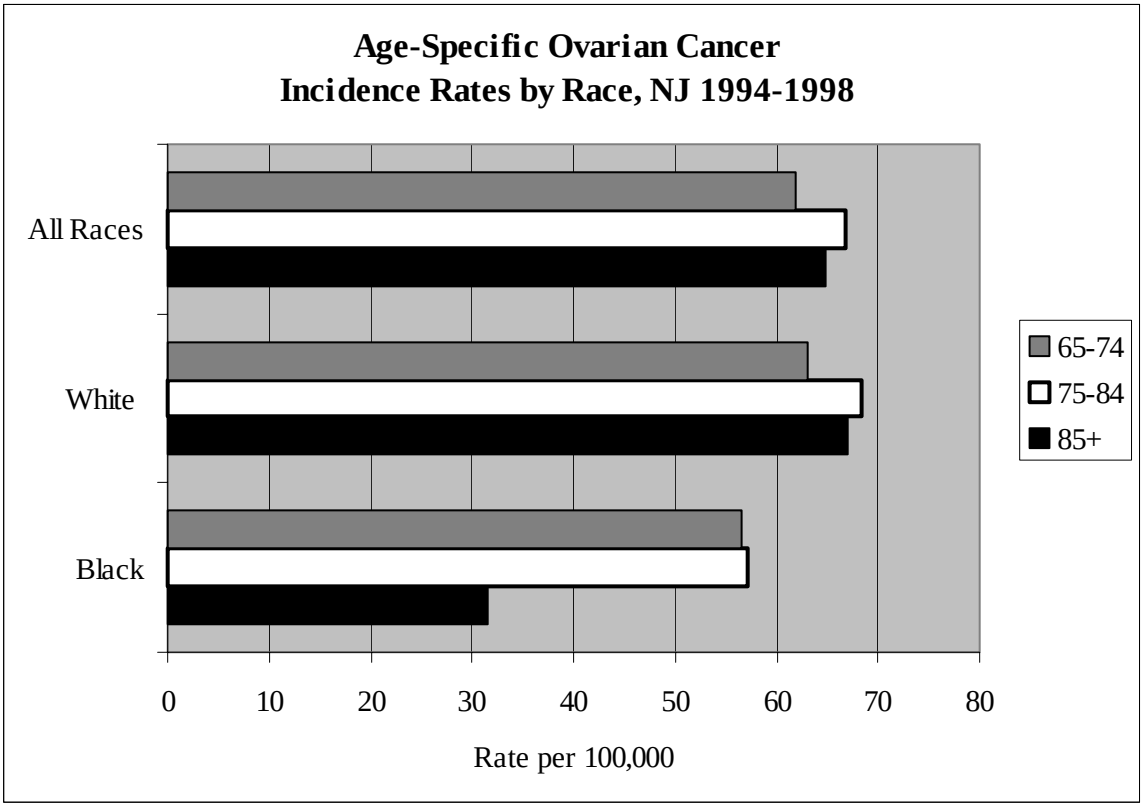

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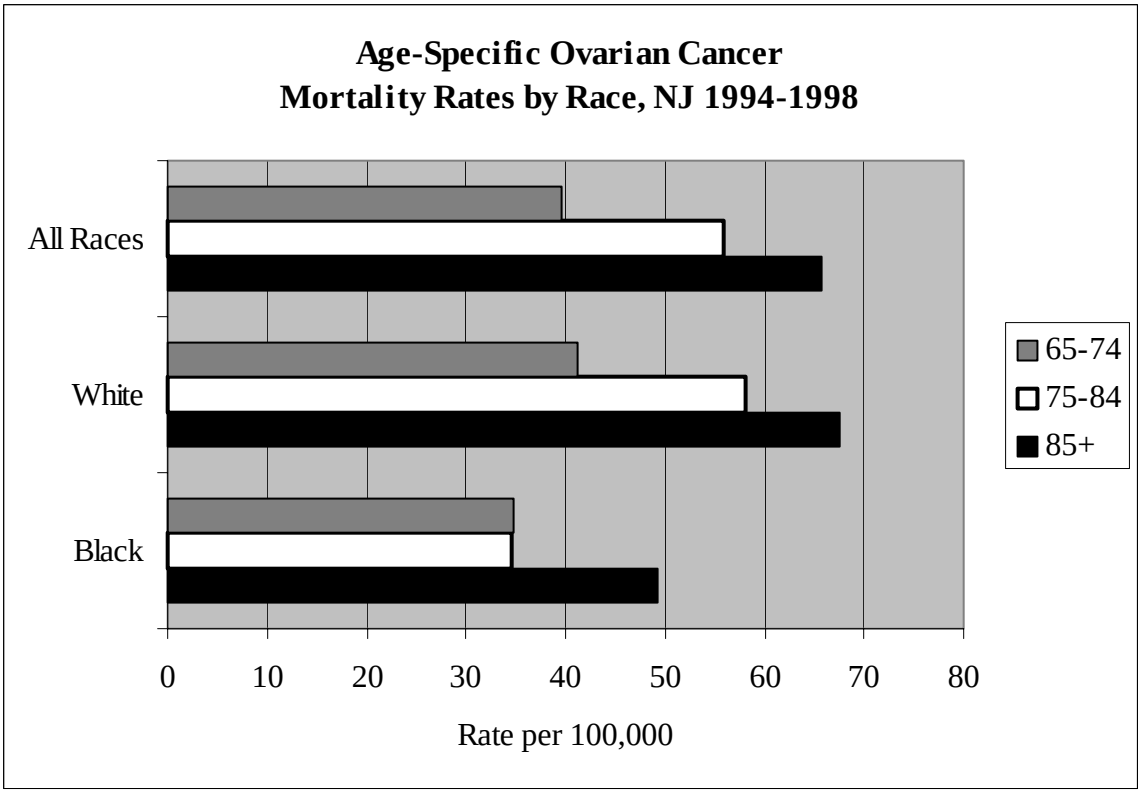

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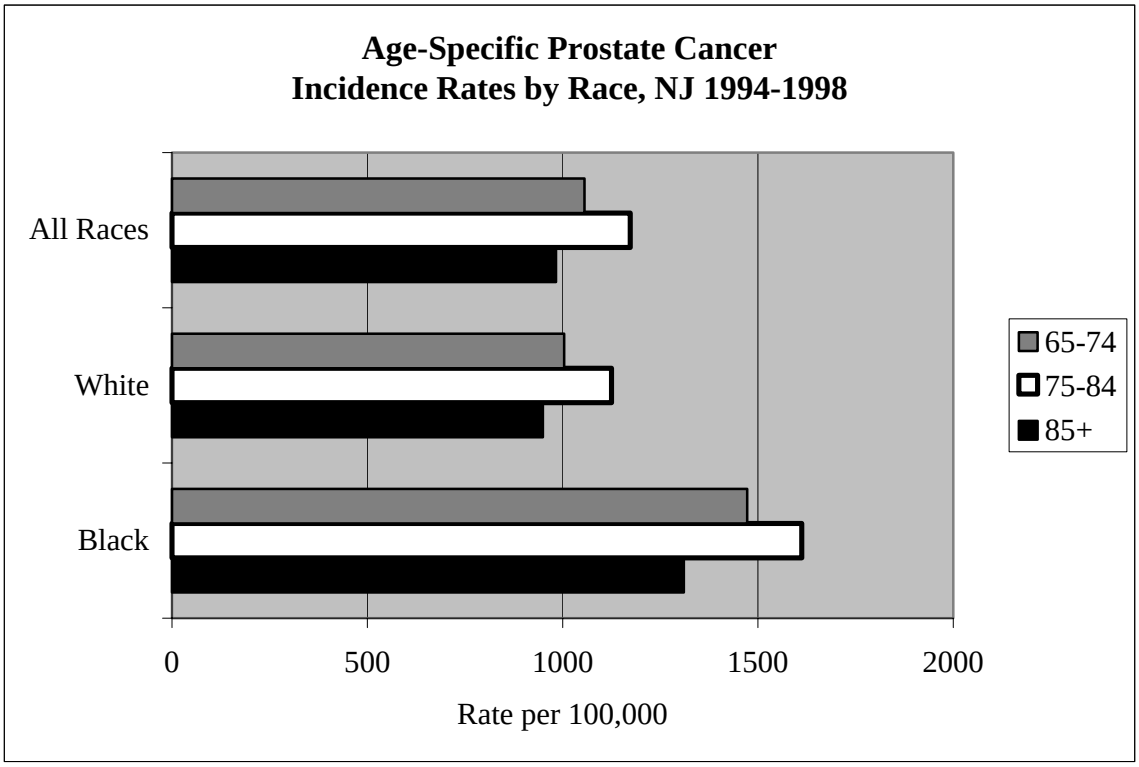

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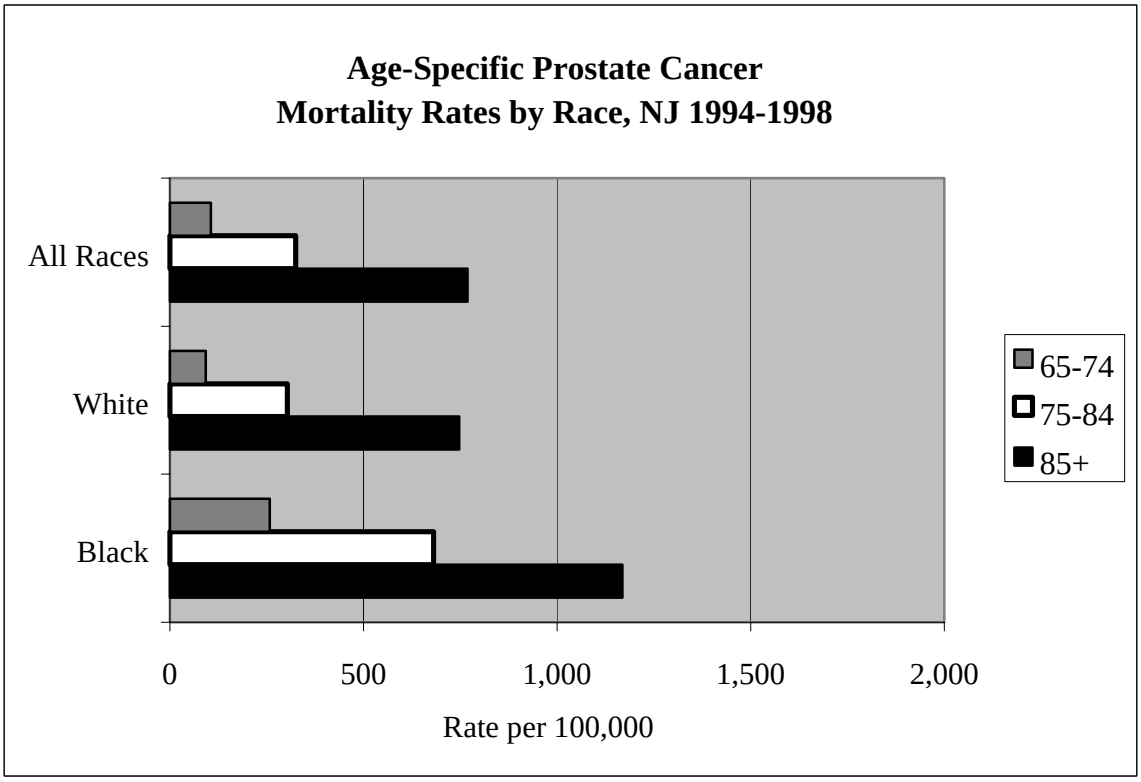

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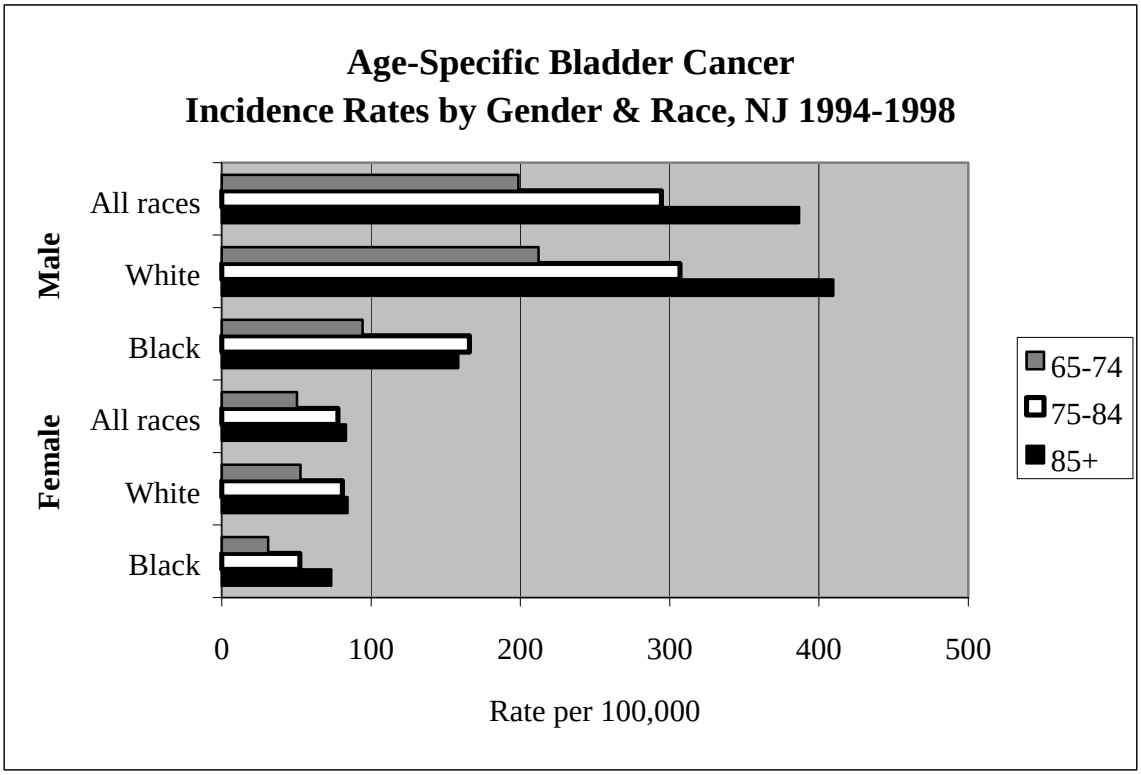

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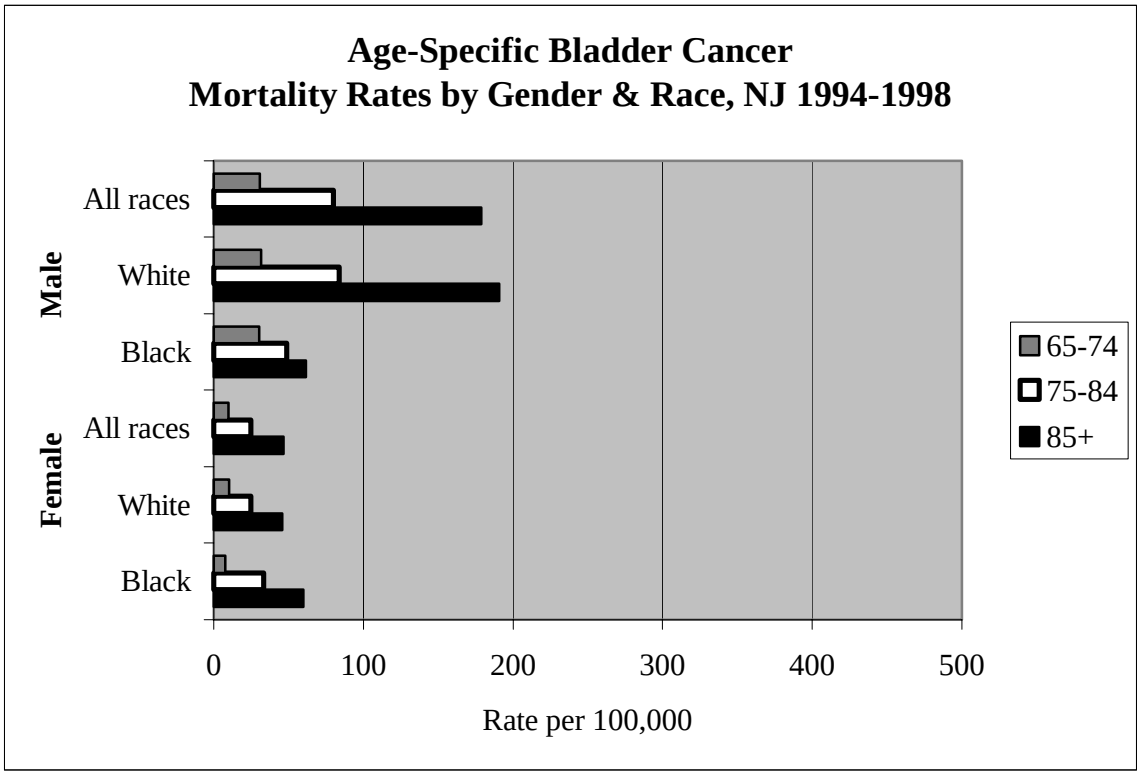

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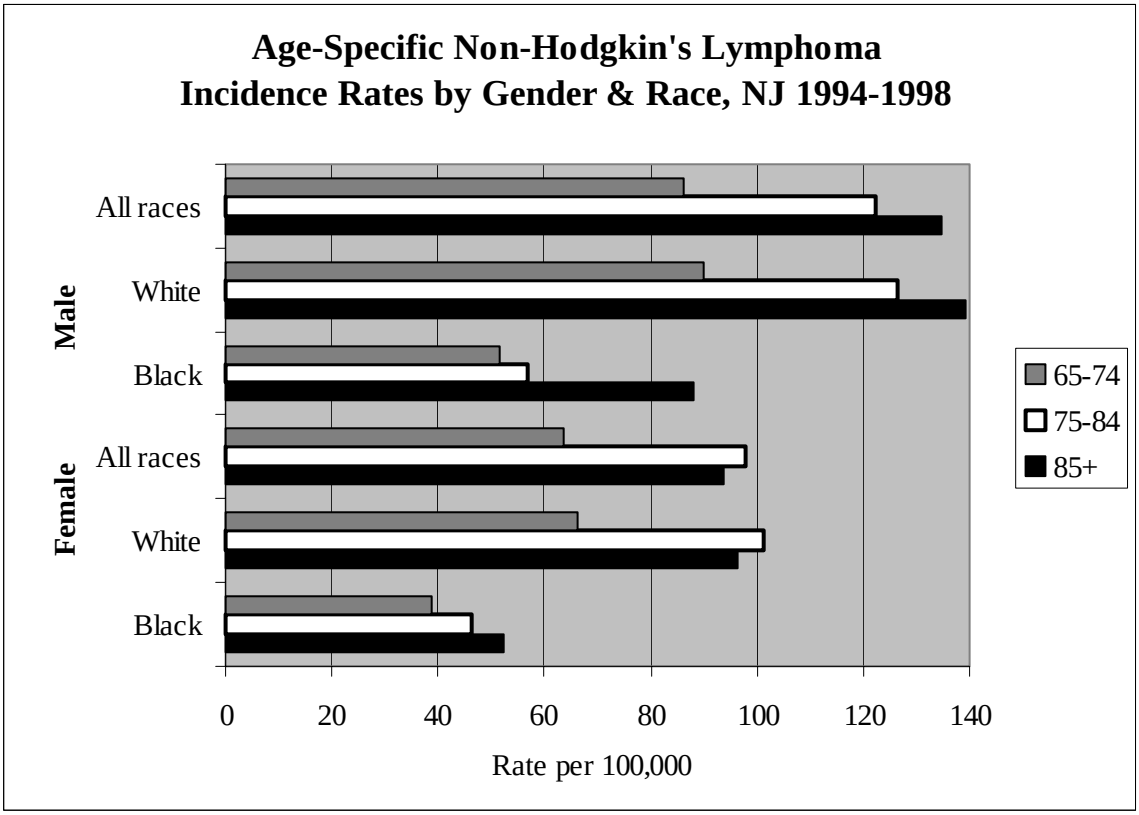

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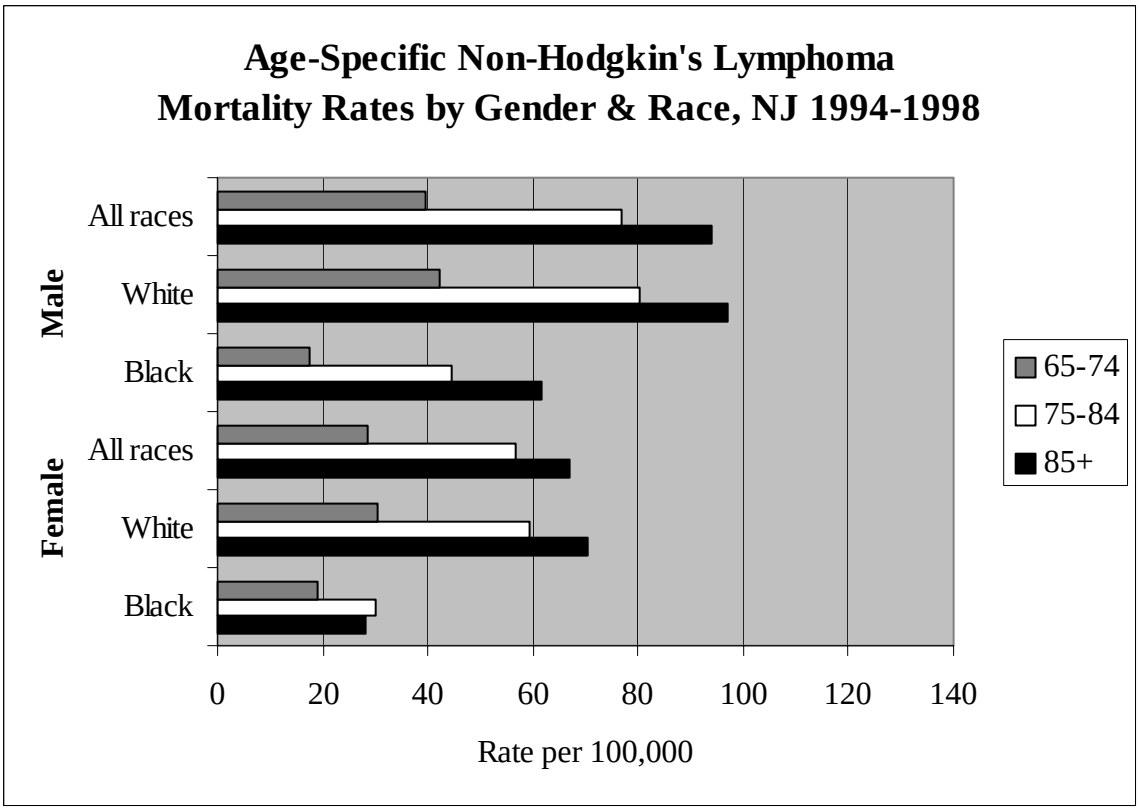

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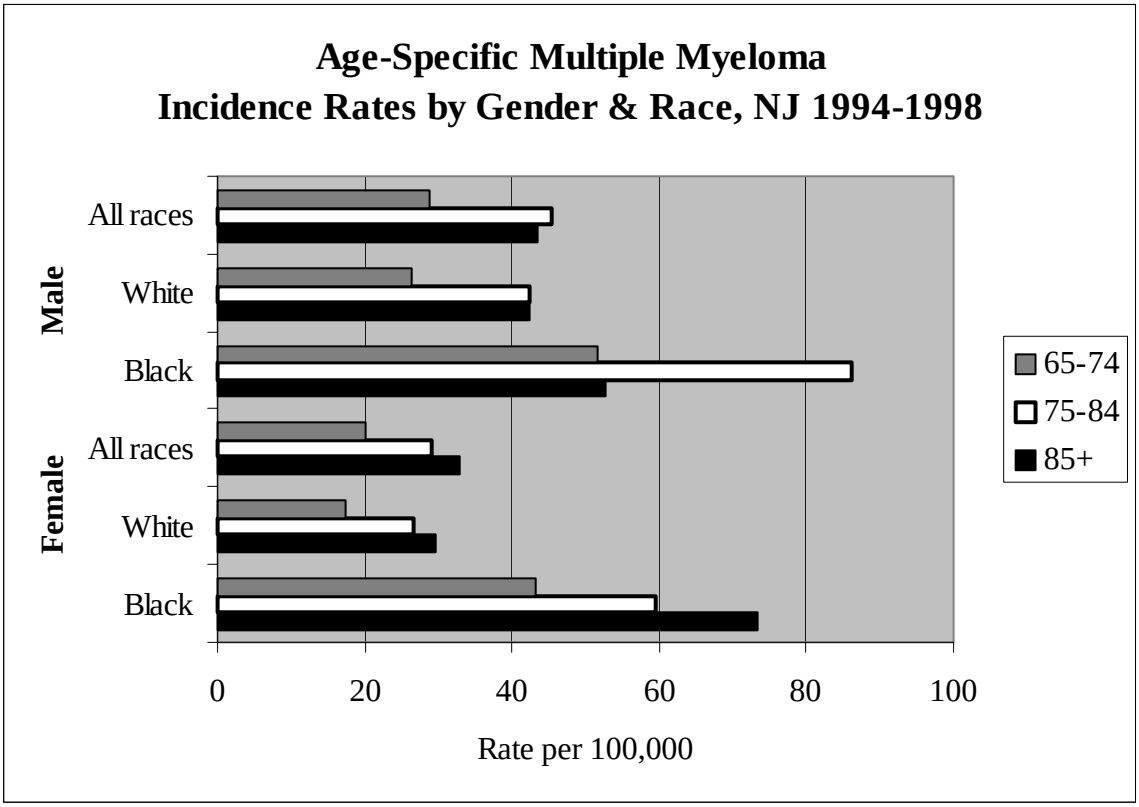

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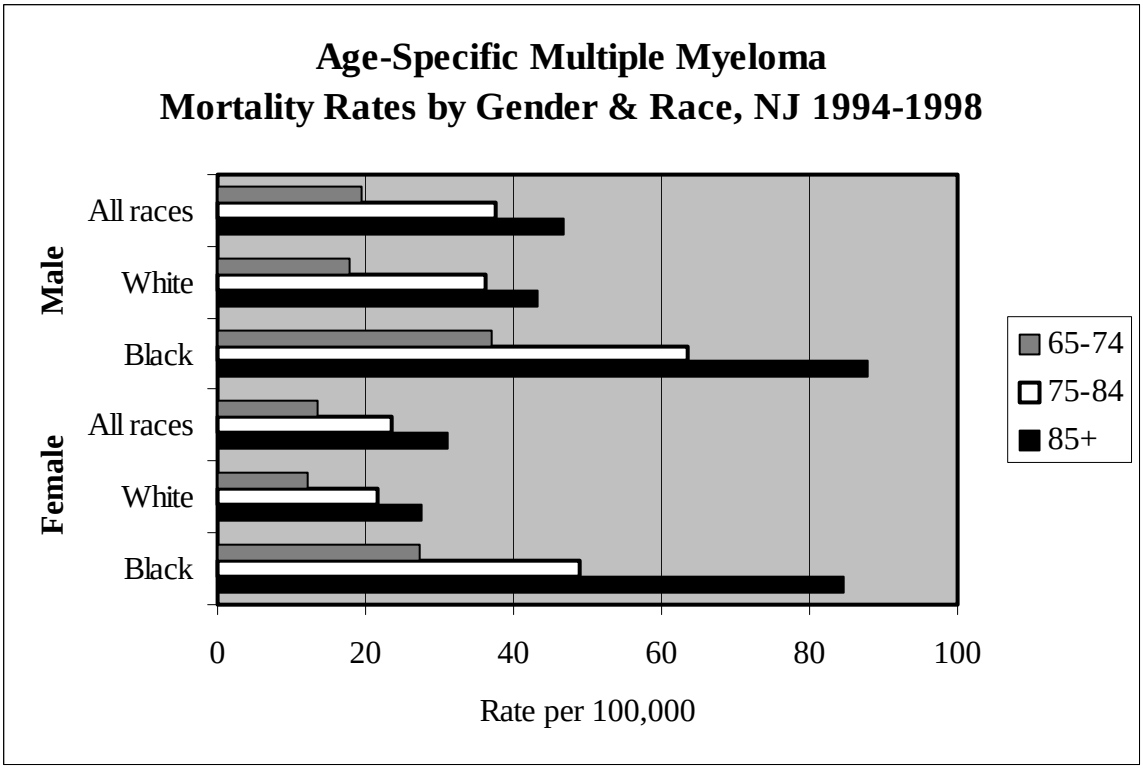

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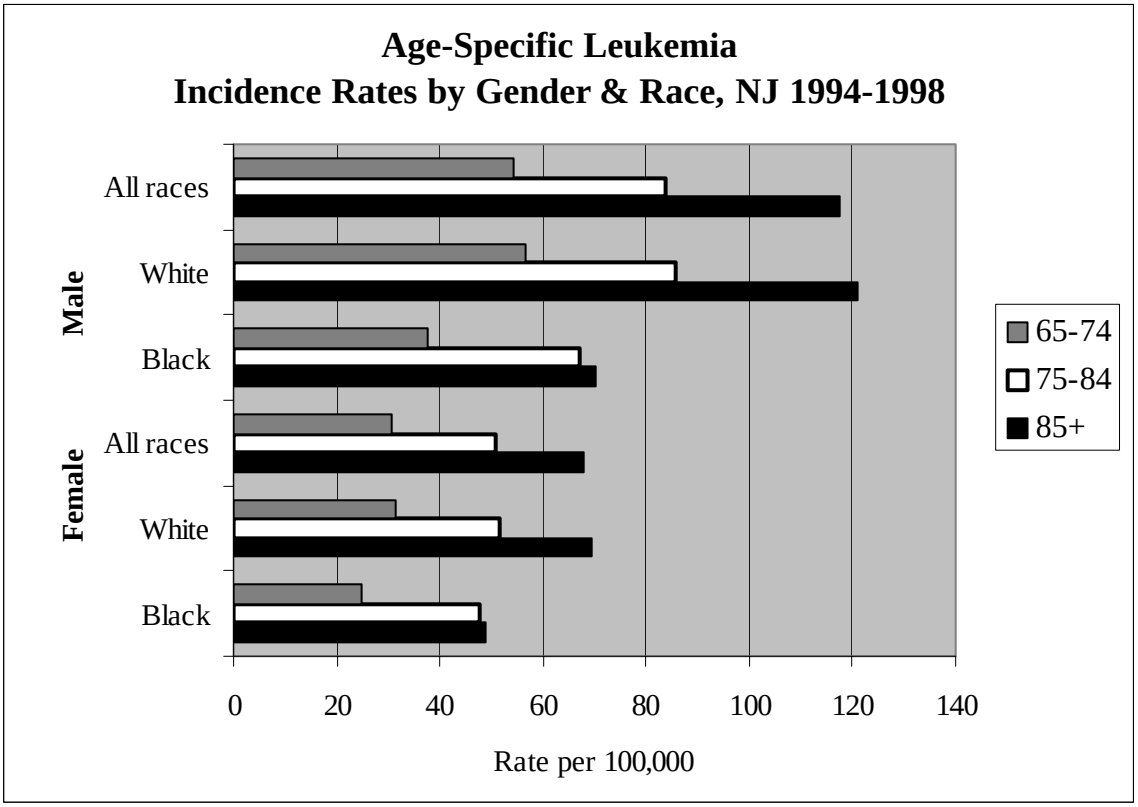

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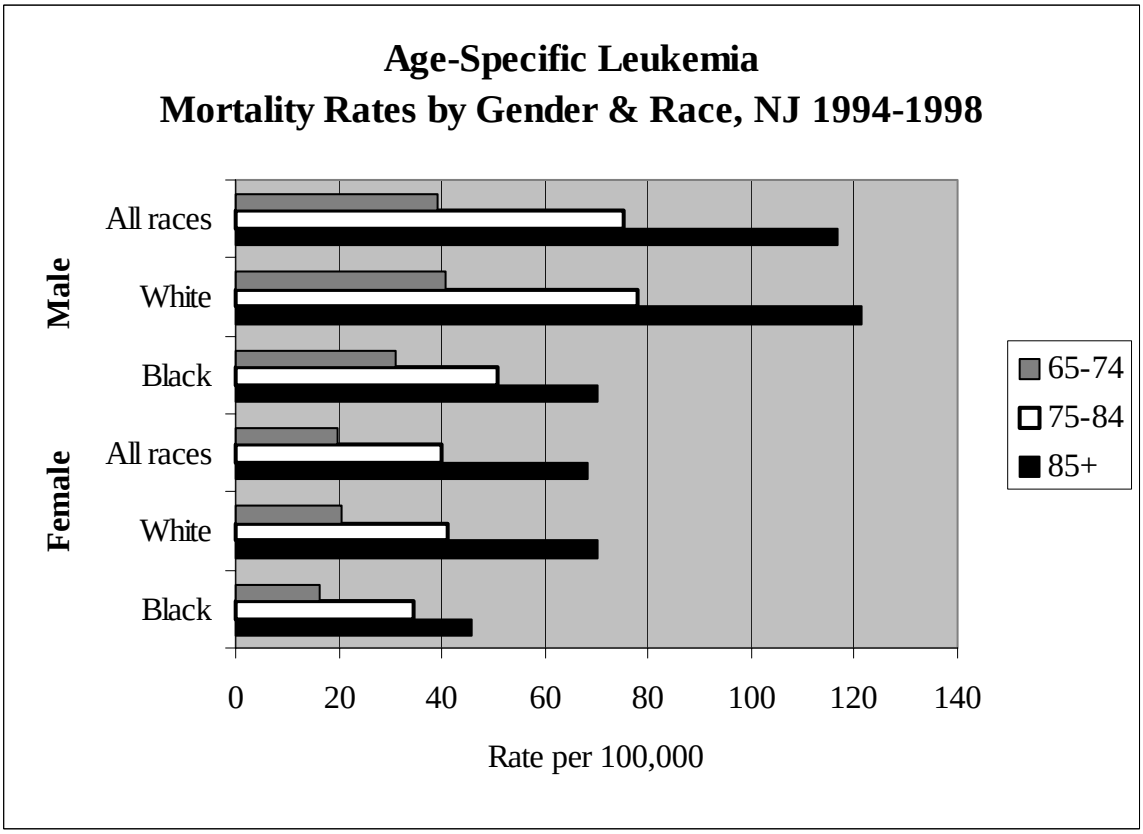

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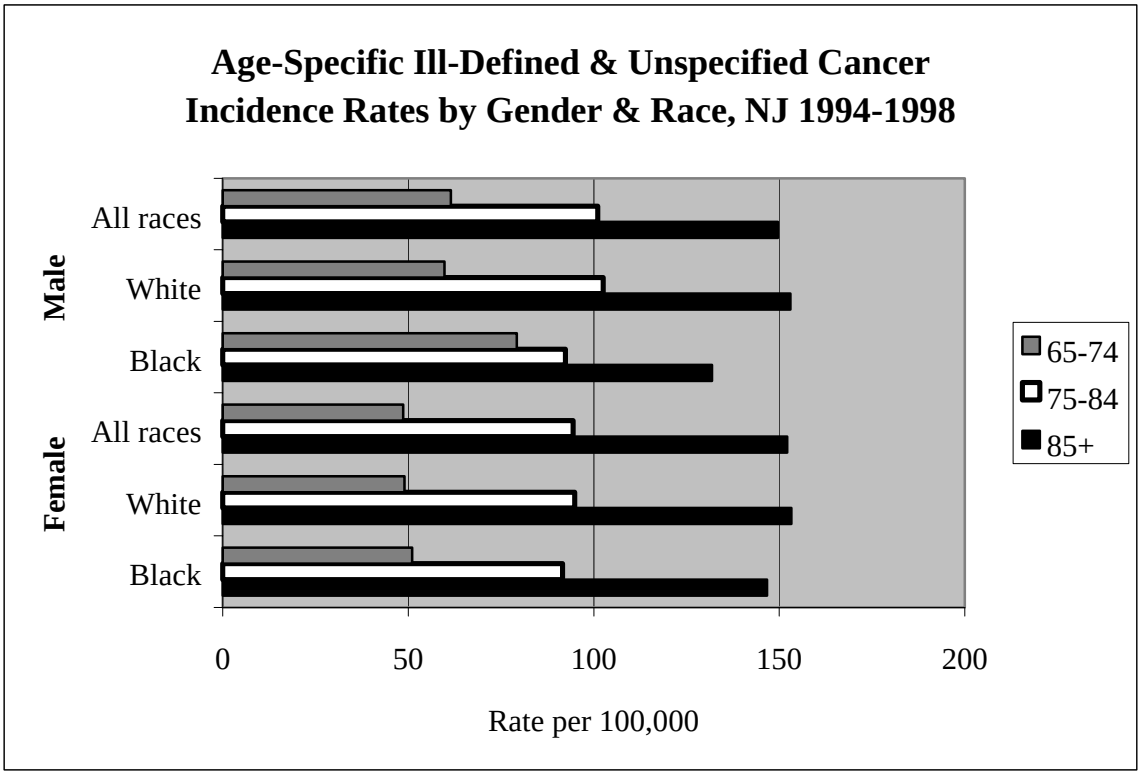

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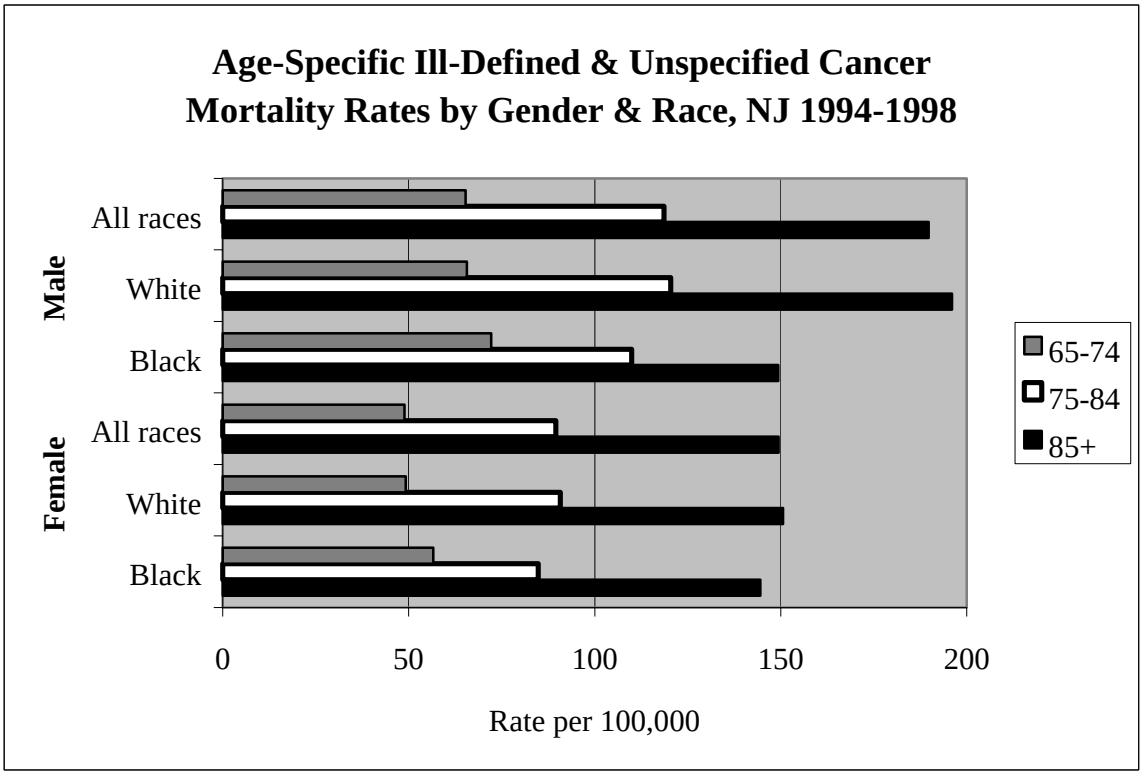


STAGE AT DIAGNOSIS FOR SELECTED SITES AMONG OLDER ADULTS, 1994-1998

Stage is a measure of the spread of cancer from the site of origin at the time of diagnosis and is most important for determining optimal treatment selection. The National Cancer Institute's SEER (Surveillance, Epidemiology and End Results Reporting) Program, defines summary staging as follows: 1) *in situ* stage as noninvasive or noninfiltrating; 2) localized stage as invasive but confined to the organ of origin; 3) regional stage as beyond the organ of origin by direct extension to adjacent organs/tissues and/or regional lymph nodes; and, 4) distant stage as metastasis or direct extension to distant organs or lymph nodes. A cancer is not staged when a physician cannot determine the extent of its spread.

Unfortunately, the proportion of unstaged cases often increases with age. Staging cancer usually requires extensive surgery and testing which may cause physical, emotional or financial hardship for the patient. The costs of procedures necessary for staging may not outweigh the benefits depending on the patient's co-morbidities, treatment options, perceived quality of life or life expectancy.

The cancer sites presented in this section were selected because screening for these cancers is available and recommended. Successful screening programs detect cancer at its earliest stages before symptoms appear. Many Healthy New Jersey 2010 objectives are directed toward increasing the percent of older adults who participate in screening for certain cancers and increasing the percent of cancers diagnosed at an early stage. An early stage at diagnosis is important for predicting a good prognosis and successful treatment of many cancers.

For the purpose of this report, an early stage at diagnosis refers to a diagnosis at the *in situ* or local stage, and a late stage diagnosis refers to a diagnosis at the distant stage. We present the distribution of stage at diagnosis by age group with gender and race breakdowns, where possible. Data are aggregated by the five-year period to reduce the instability produced by small numbers of cases in population stage, age and race groups. Cancer sites with a favorable pattern of stage at diagnosis would be ones showing the highest proportions of cases diagnosed at early stages.

Oropharyngeal (Figures 40-41): The stage distributions for men do not exhibit a favorable pattern. For each age group, diagnosis at the regional stage comprised the highest proportion of patients. Women have earlier stage at diagnosis in the younger two age groups compared with men possibly attributable to better oral screening. Increased screening for both men and women could lead to an earlier diagnosis.

Colorectal (Figures 42-45): Older men and women have similar but unfavorable staging patterns, with only 33 percent of men and 32 percent of women diagnosed at an early stage. The percent distributions by stage for white men and women are similar to those for black men and women. Black women aged 65-74 have the highest percentage diagnosed at the early stage and black women aged 75-84 are most likely to be diagnosed at the regional stage. Increased use of screening for all older men and women could lead to earlier stage at diagnoses.

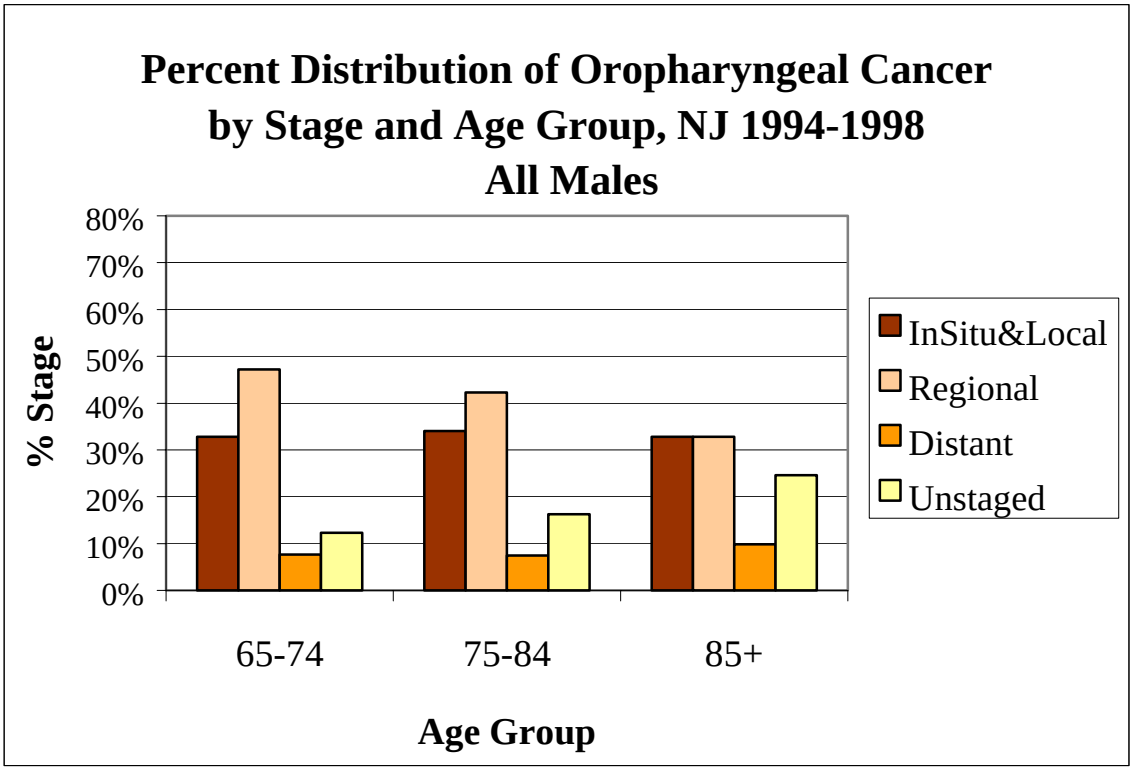
Melanoma of the Skin (Figures 46-47): Percent distribution by stage is presented here for whites only since over 90 percent of cases of melanoma of the skin are diagnosed among whites. Over 70 percent of all white patients are diagnosed in the early stage for all age and gender groups with the exception of women 85 and older (68%). Though these favorable patterns of stage at diagnosis are similar between white men and women, women have progressively lower proportions of early stage diagnoses with increasing age.

Female Breast (Figures 48-49): A favorable staging pattern is evident for both white and black women diagnosed with breast cancer. However, black women have a higher proportion of later stage disease compared with white women. Women age 85 and older have the smallest proportion of early stage disease and may benefit from increased screening efforts.

Cervical (Figures 50-51): *In situ* diagnoses after 1995 for this cancer are no longer reportable to the New Jersey State Cancer Registry and are therefore not included in these figures. Cervical cancer, when detected at a pre-invasive or early stage is one of the most highly treatable cancers with a 5-year survival rate close to 100%. The patterns of stage at diagnosis shown here illustrate a clear need for increased levels of screening (through use of the Pap test) for women age 65 and older. Among both white and black women the highest proportions of patients are diagnosed at the regional stage. In the younger two age groups black women have much higher proportions diagnosed at the regional stage compared with white women. Among women 85 and older, black women have a lower percentage diagnosed at the regional stage, but a higher percentage diagnosed at both the early and distant stage compared with white women.

Prostate (Figures 52-53): Screening for this cancer has had a large impact on the distribution of patients by stage at diagnosis. Over half of all men under age 85 are diagnosed at an early stage. However, the proportion diagnosed early decreases with increasing age. About 40 percent of men age 85 and older are diagnosed at an early stage compared with 70 percent for men aged 65-74. Conversely, the proportion of patients not staged increases substantially with age with white men having a higher proportion of unstaged disease compared with black men. This may be because prostate cancer usually progresses slowly and many patients opt for the "watchful waiting" and forego further testing necessary to determine the stage of disease. Also, black men generally have a higher proportion of regional and distant stage disease compared with white men.

Figure 40.



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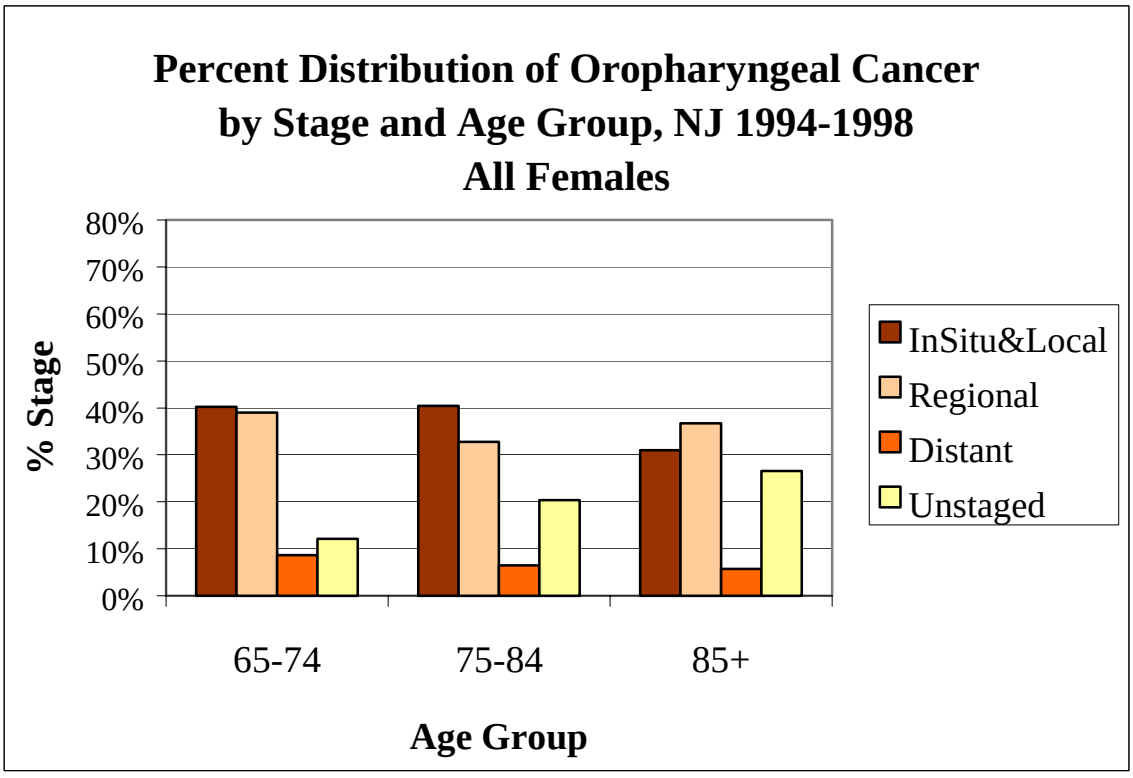

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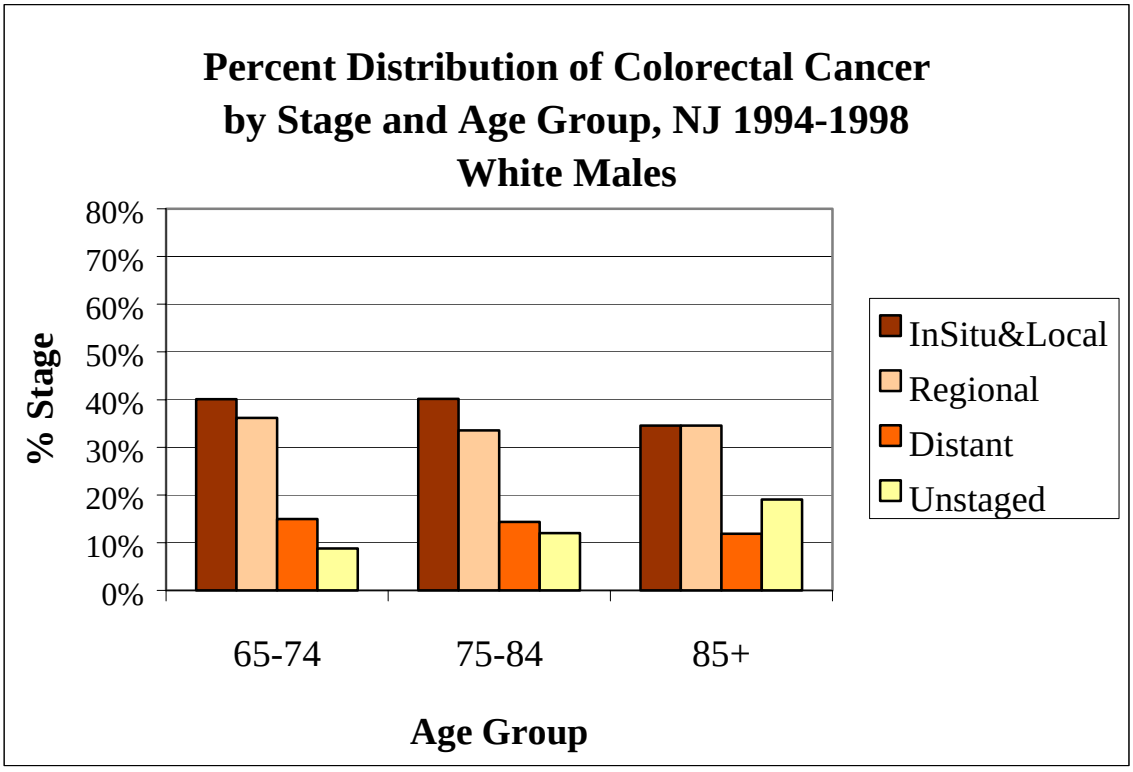

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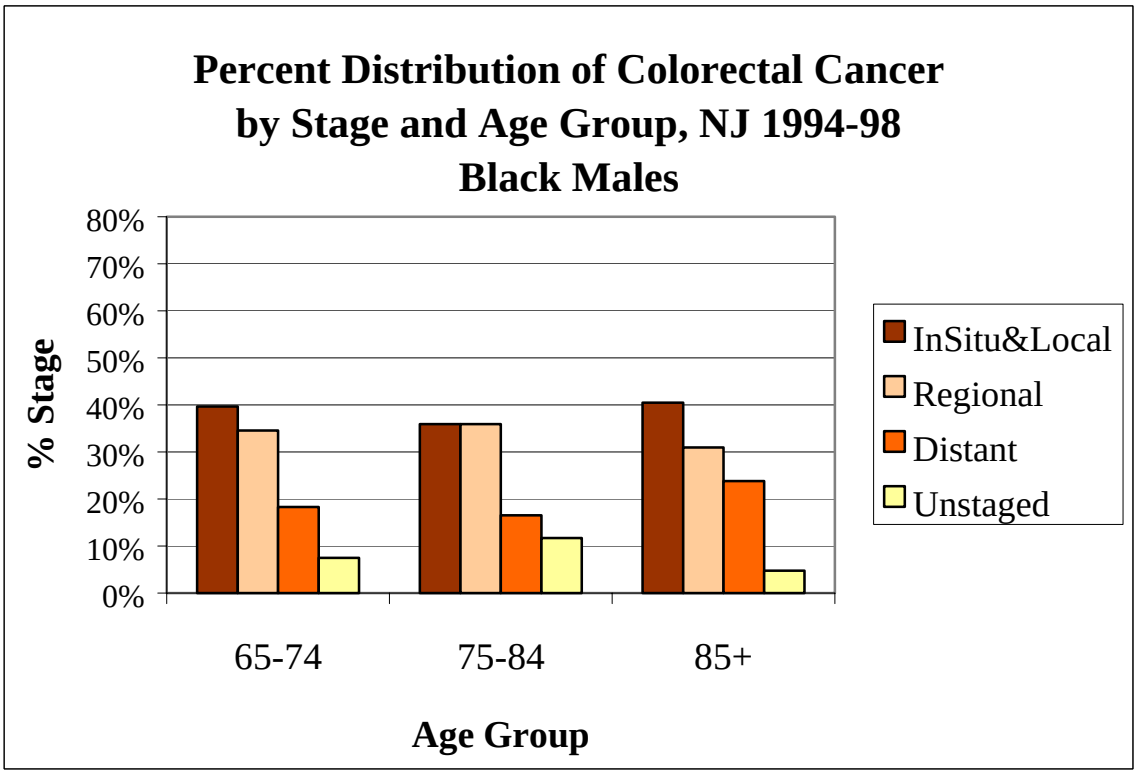

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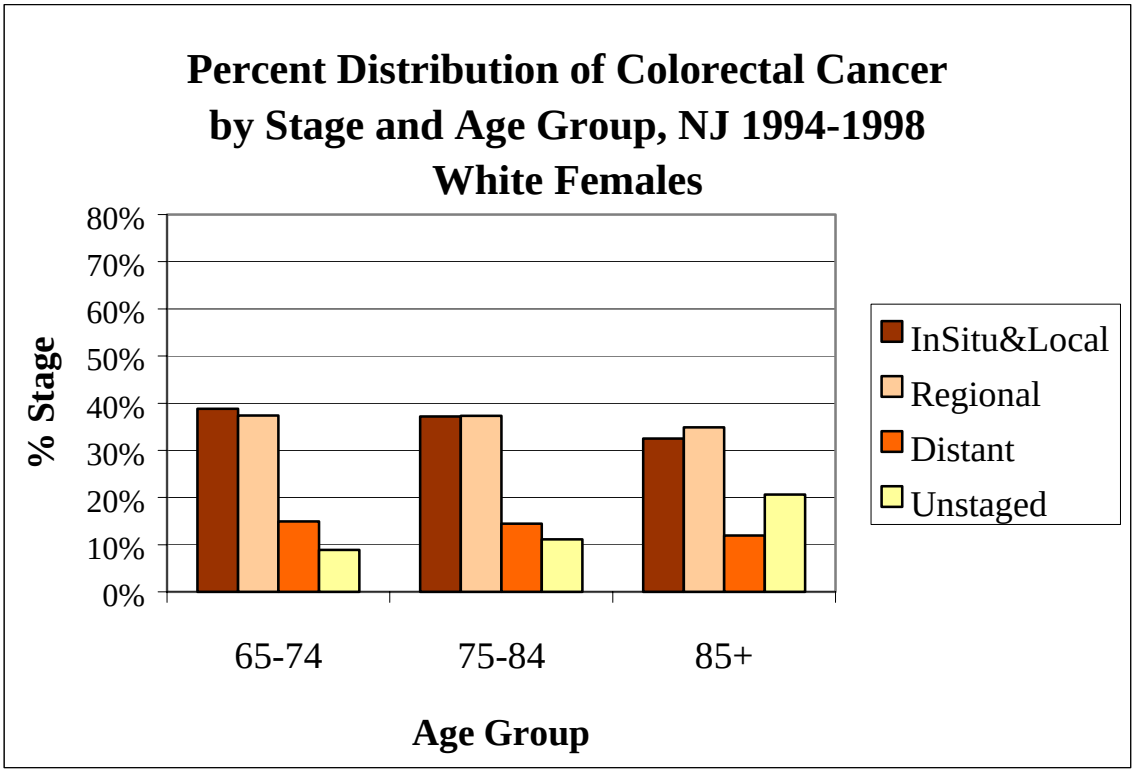

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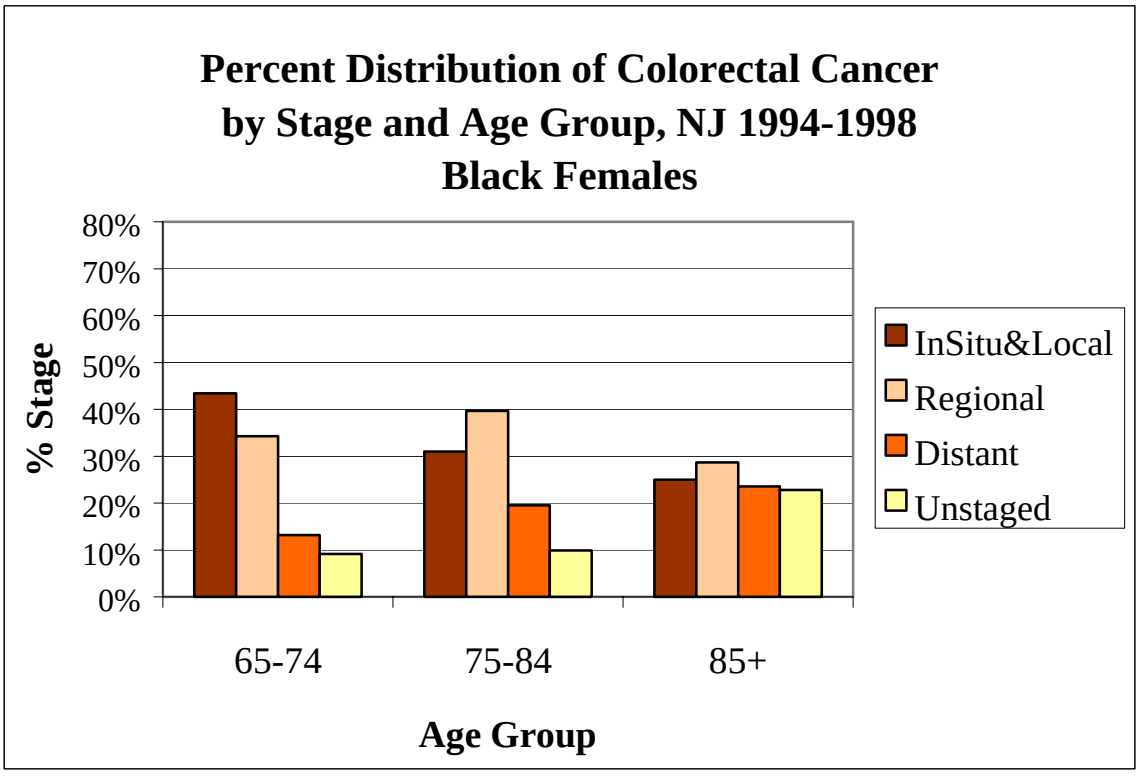

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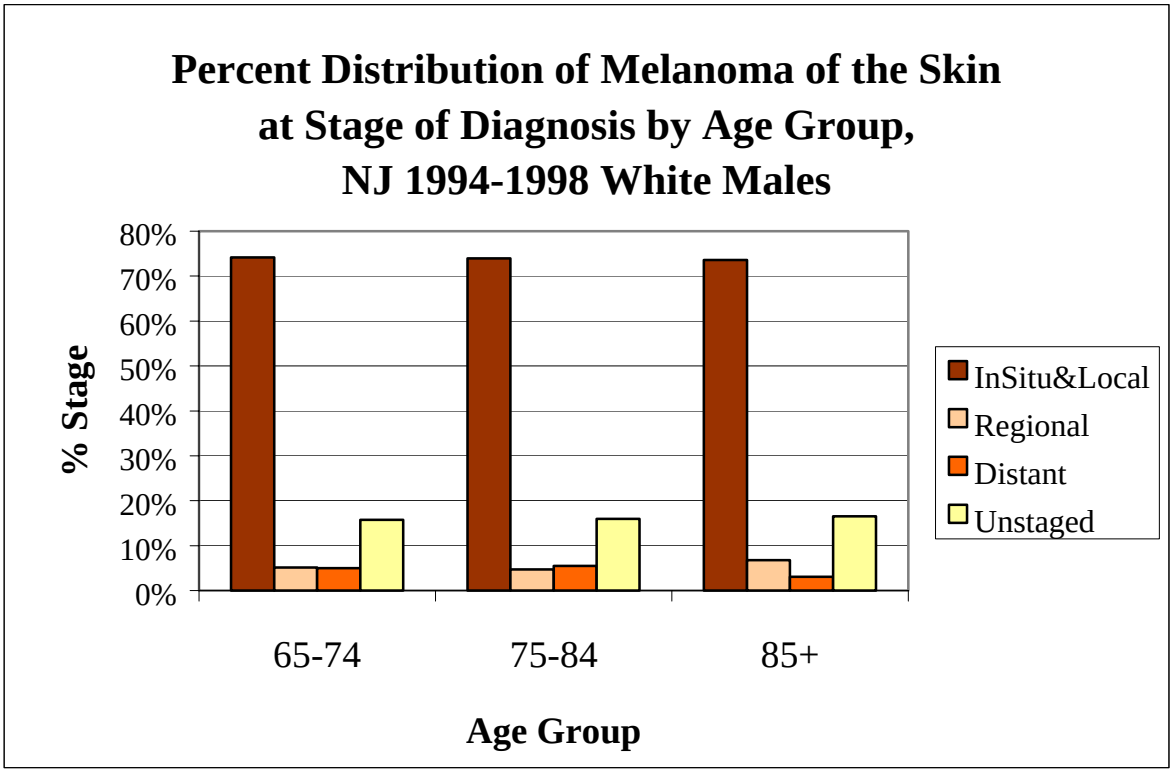

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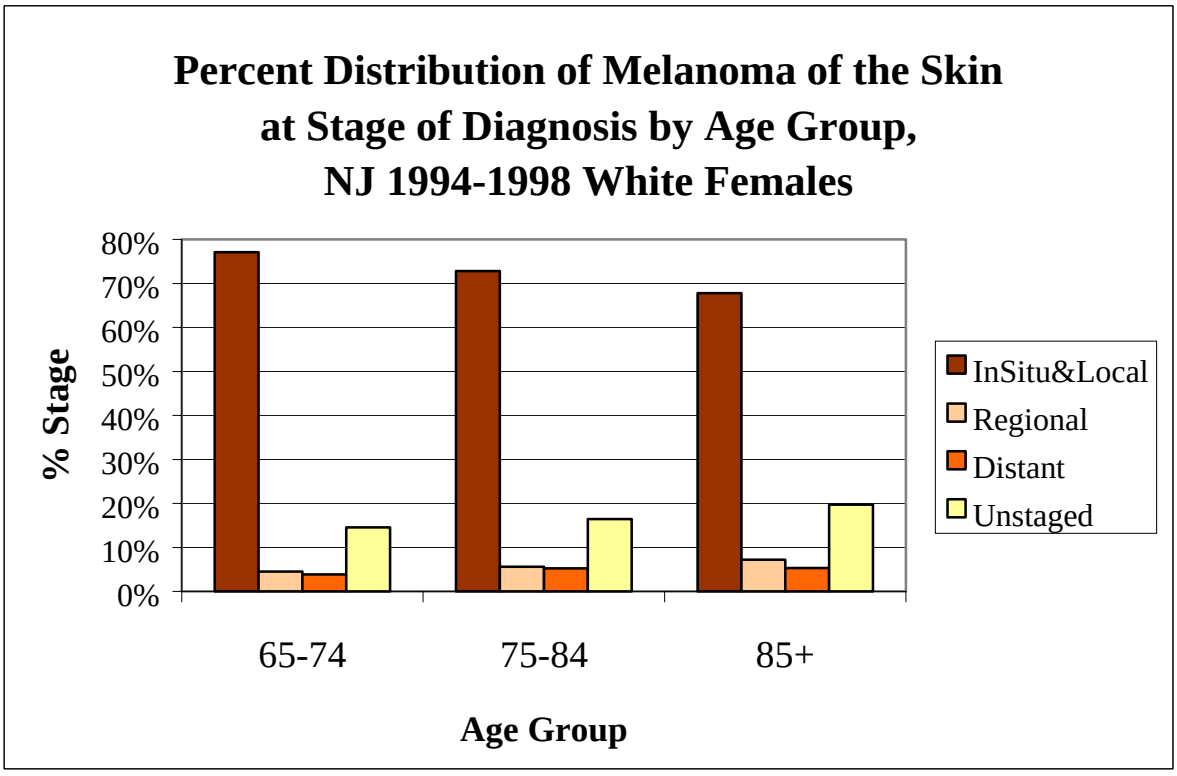

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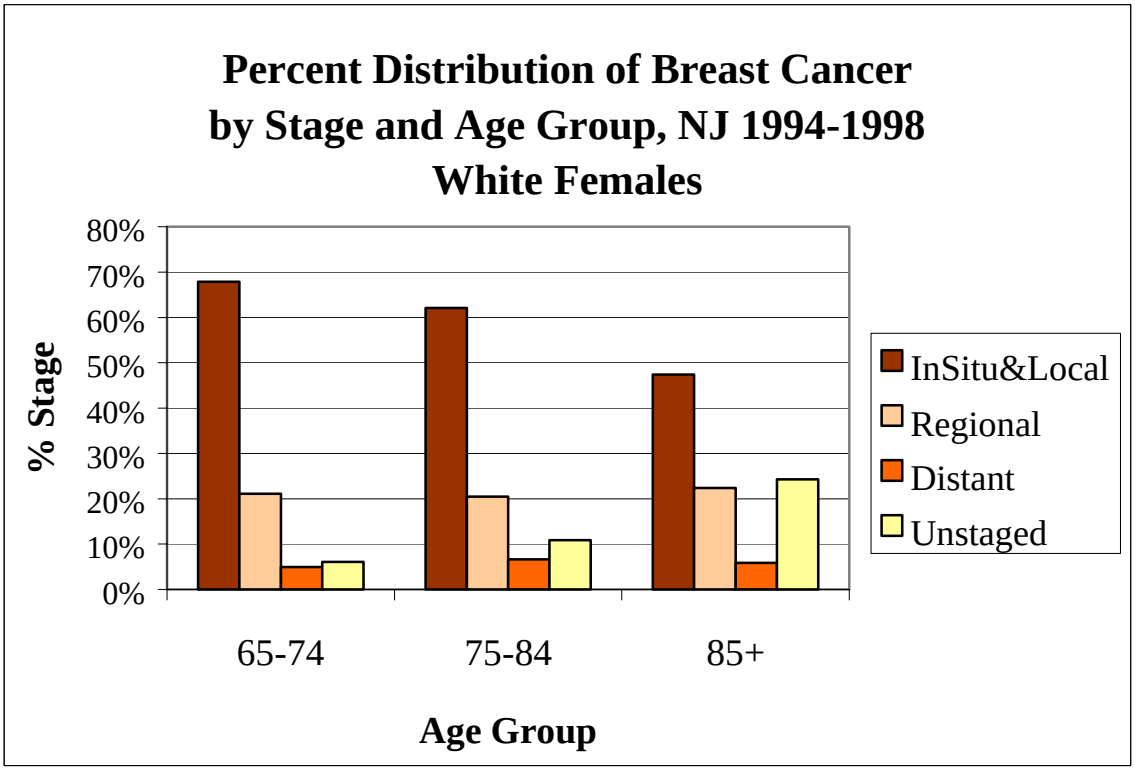

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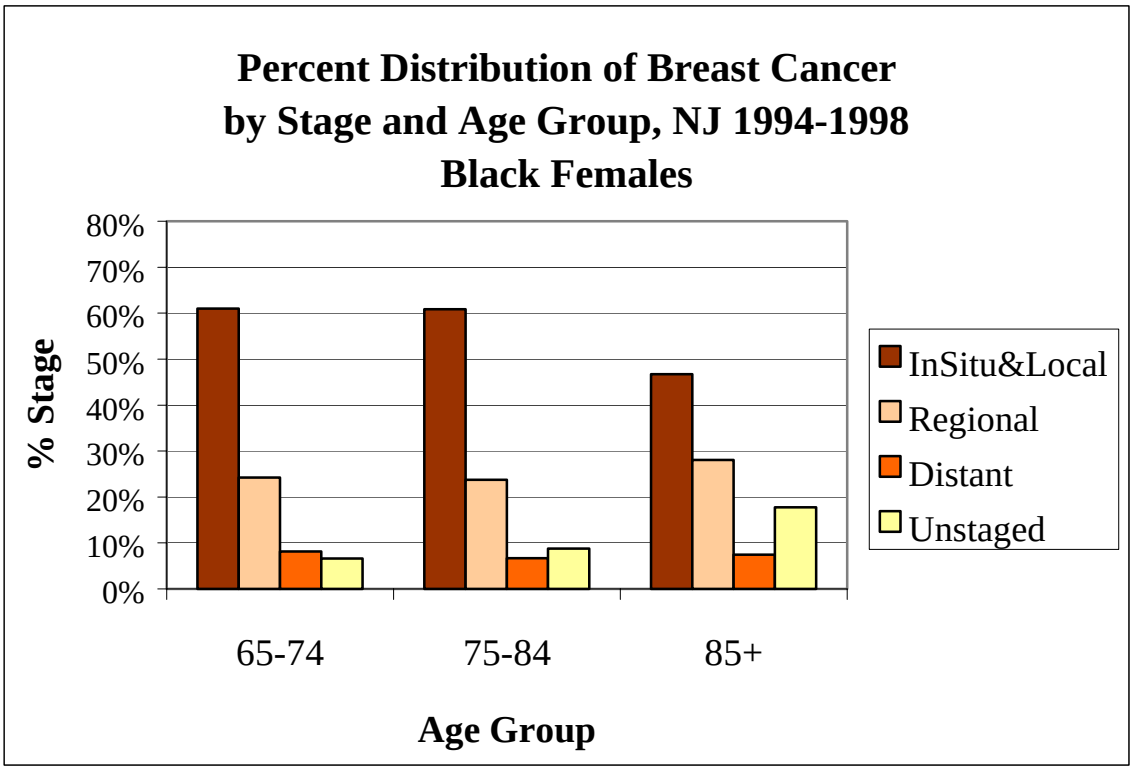

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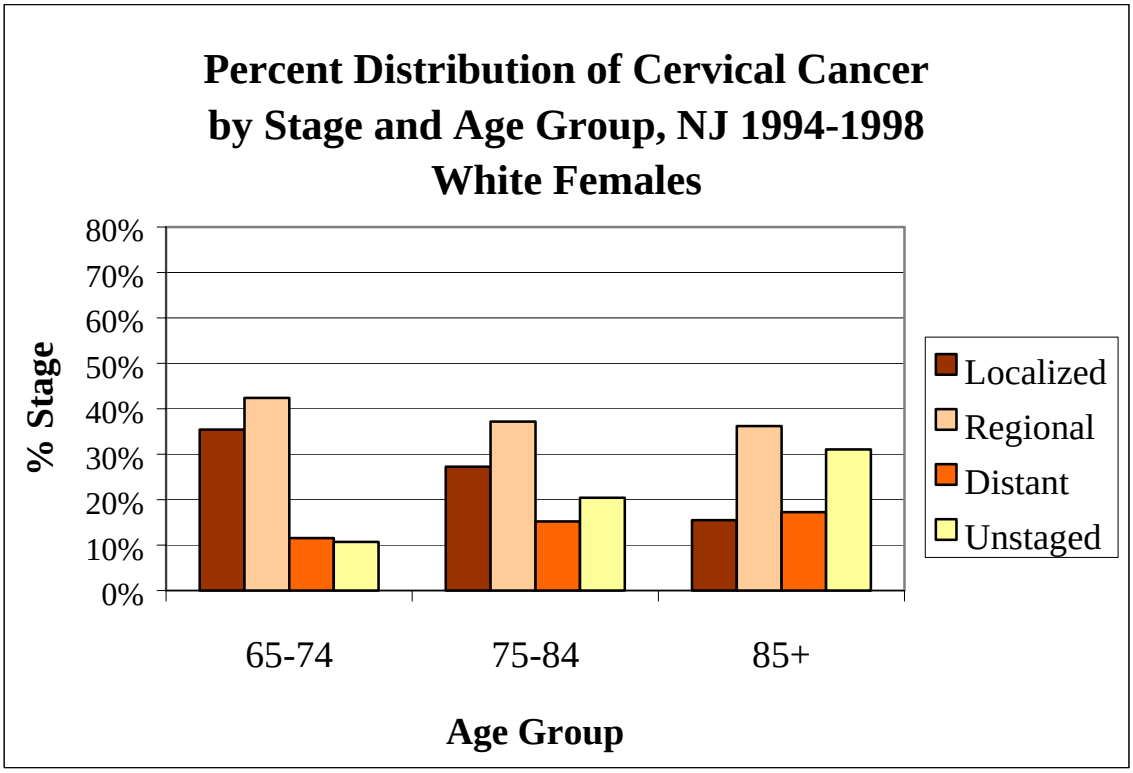

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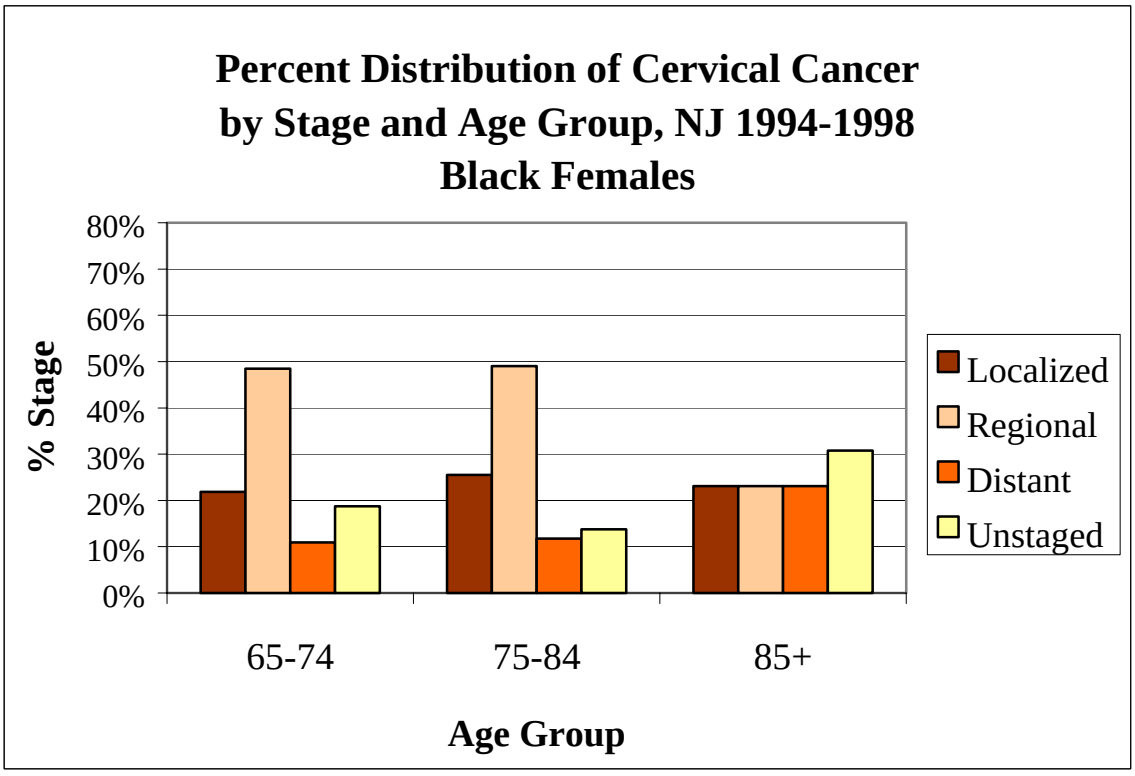

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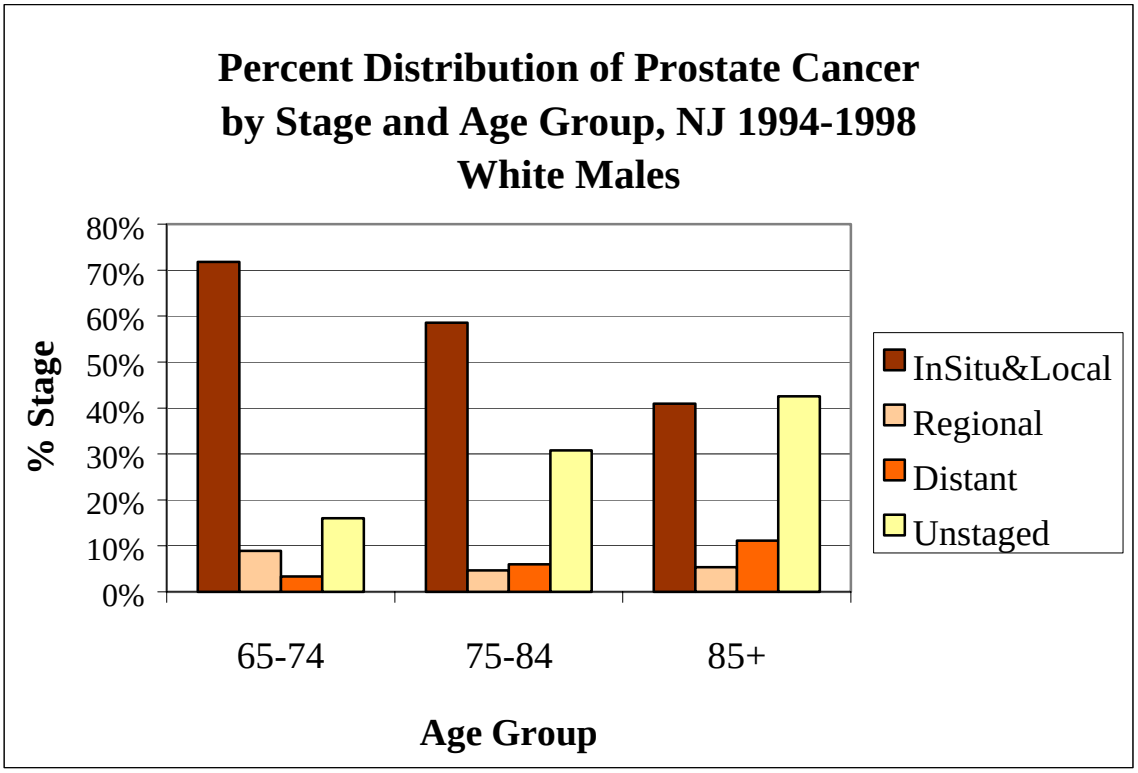

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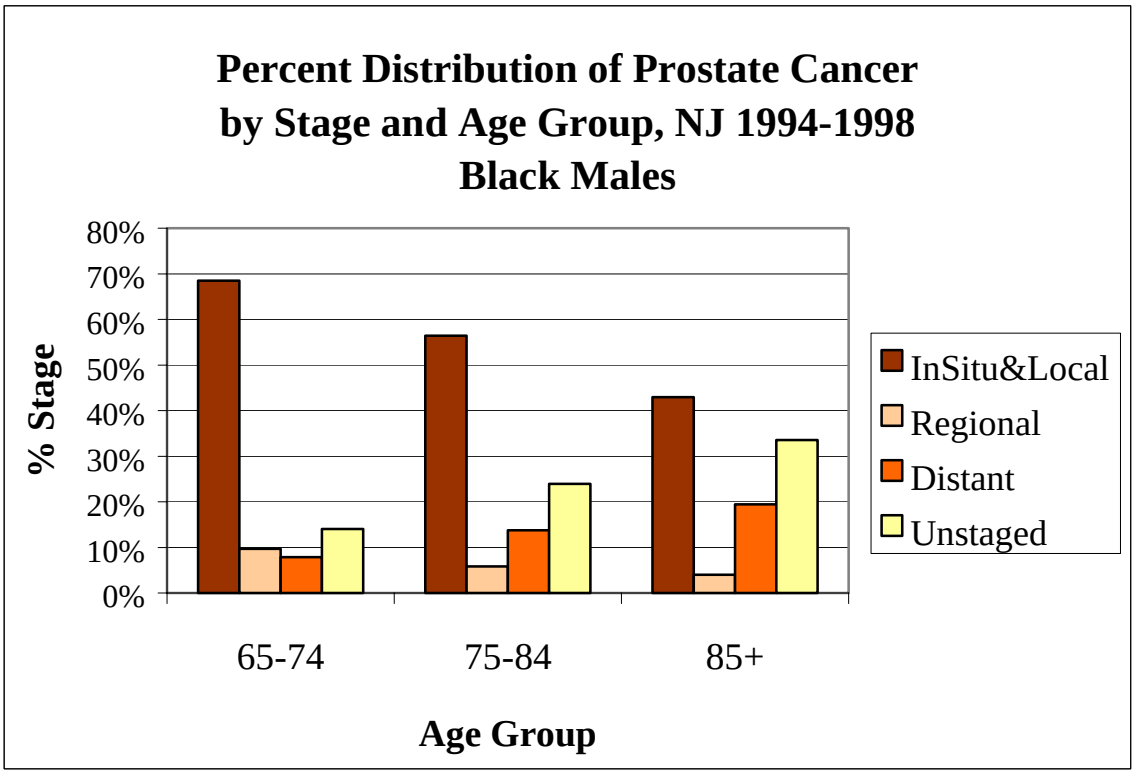

COMPARISON OF OLDER ADULT CANCER INCIDENCE AND MORTALITY BY SITE, NEW JERSEY vs. U.S., 1994-1998

Tables 1 and 2 show age-specific incidence and mortality rates for men and women age 65 and older by race for New Jersey and the U.S. Rates are presented for total cancer and for 16 major cancer sites. For comparison, we obtained the most recent detailed U.S. cancer incidence data from the SEER Cancer Incidence Public-Use Database, 1973-1998 and mortality data from the Centers for Disease Control and Prevention's CDC Wonder.

Historically, New Jersey has been representative of the Northeast region, which tends to have higher cancer incidence and mortality rates than the U.S. as a whole. This trend also seems to apply when looking at older adults. The most important differences are discussed below, noting that these differences vary by age group.

Cancer Incidence (Table 1): For total cancer, New Jersey incidence rates for older men age 65 and older, are approximately 13 percent higher than U.S. rates. For older women age 65 and older, rates are approximately 12 percent higher for New Jersey compare with the U.S.

New Jersey colon cancer rates for older adults are 20 to 30 percent higher than U.S. rates for both men and women depending on age group and race. Prostate cancer incidence rates for older men vary from 10 to 20 percent higher in New Jersey than the U.S. depending on age group and race. Incidence rates for most other sites tend to run higher than U.S. rates, but the differential is not as great.

However, sites which have some lower incidence rates in New Jersey compared with the U.S. among various age groups for older adults include, oropharyngeal, multiple myeloma and leukemia. For men and women aged 65-84, oropharyngeal cancer incidence rates are lower compared with the U.S. New Jersey white men have lower incidence rates than the U.S. among all older age groups for multiple myeloma and leukemia. Lower incidence rates are also seen for pancreatic cancer among black women and uterine cancer among white women age 75 and older compared with the U.S.

Cancer Mortality (Table 2): For total cancer, New Jersey mortality rates for older men of all races and white men are one to ten percent higher then U.S. rates depending on age group. However, mortality rates for black men are slightly lower compared with the U.S. in all older age groups. For older women, mortality rates are 4 to 14 percent higher in New Jersey compared with the U.S., with rates for black women slightly higher than for white women.

The majority of cancer sites for older adults in New Jersey have higher mortality rates than the U.S. to varying degrees and with varying age group patterns. New Jersey stomach cancer mortality rates vary from 26 to 45 percent higher than U.S. rates for older white men and women depending on age group. New Jersey colorectal cancer mortality rates vary from 16 to 25 percent higher than U.S. rates for white men and women, with the highest disparity

among the 75-84 year olds. New Jersey uterine cancer rates are approximately 35 percent higher for white women aged 65-84 compared with the U.S.

Older black men in New Jersey have lower cancer mortality rates than the U.S. for total cancer (about 4 percent lower) and for a majority of cancer sites depending on age group. There are lower lung cancer mortality rates in New Jersey among all men aged 65-84 as well as for white women aged 65-74 compared with the U.S. Cervical and uterine cancer rates in New Jersey are lower than U.S. rates for all women age 85 and older. New Jersey pancreatic cancer rates for older black men and women are about 4 percent lower than U.S. rates. Lower mortality rates for multiple myeloma in New Jersey are seen for both men and women in many older age groups, but especially for those aged 65-74.

Table 1. Age-Specific Cancer Incidence Rates by Site, Race & Gender, NJ vs US, 1994-1998

Cancer Sites	Age Group	Male						Female					
		All Races		White		Black		All Races		White		Black	
		NJ	US	NJ	US	NJ	US	NJ	US	NJ	US	NJ	US
All Sites	65-74	2,827.2	2,515.7	2,780.5	2,502.7	3,290.0	3,089.8	1,612.3	1,472.0	1,637.4	1,529.0	1,500.4	1,447.4
	75-84	3,567.2	3,204.1	3,547.2	3,181.3	3,799.5	3,533.1	2,110.0	1,904.7	2,138.8	1,947.8	1,913.4	1,816.6
	85+	3,660.4	3,211.5	3,715.2	3,222.6	3,183.3	3,086.1	2,157.8	1,895.2	2,176.6	1,910.0	1,998.5	1,866.4
Oropharyngeal	65-74	57.2	63.0	^	^	^	^	23.5	25.4	^	^	^	^
	75-84	53.3	68.4	^	^	^	^	27.7	29.2	^	^	^	^
	85+	71.9	62.5	^	^	^	^	35.5	30.1	^	^	^	^
Stomach	65-74	61.1	54.8	58.7	46.7	85.1	83.2	25.7	22.3	23.8	17.7	35.3	34.7
	75-84	93.6	87.4	90.2	76.3	113.4	129.5	48.9	41.1	46.7	34.2	78.5	71.8
	85+	128.9	116.1	126.3	102.8	175.9	150.9	76.4	60.4	72.8	51.8	122.3	111.5
Colorectal	65-74	349.1	268.8	352.7	269.4	343.7	276.8	225.8	181.6	226.2	181.5	241.5	223.5
	75-84	527.0	435.9	535.4	440.9	468.1	441.1	389.2	317.5	394.6	320.5	353.4	342.2
	85+	636.6	509.4	665.4	525.1	343.0	433.2	509.9	417.6	517.2	426.1	450.7	390.3
Pancreatic	65-74	60.4	52.9	59.1	51.5	77.6	73.2	47.9	40.9	46.2	39.6	64.5	62.9
	75-84	83.4	82.3	86.1	80.0	54.6	106.6	79.4	69.9	79.5	68.1	83.3	100.3
	85+	100.4	97.1	100.3	95.6	131.9	105.6	101.3	89.5	103.1	87.2	83.9	134.2
Lung	65-74	479.0	420.8	475.4	417.3	573.1	577.9	259.2	248.3	264.1	263.4	257.9	254.8
	75-84	585.0	530.0	585.3	534.0	661.2	648.8	311.8	279.9	319.6	290.6	259.4	242.6
	85+	545.7	425.5	554.1	427.1	518.8	433.2	197.0	172.6	195.6	171.6	227.1	160.7
Melanoma of the Skin	65-74	67.5	62.4	^	^	^	^	31.3	29.3	^	^	^	^
	75-84	81.3	81.6	^	^	^	^	33.1	32.0	^	^	^	^
	85+	79.0	82.1	^	^	^	^	40.5	34.0	^	^	^	^
Breast (Female)	65-74	*	*	*	*	*	*	445.4	427.2	461.1	452.8	348.8	364.9
	75-84	*	*	*	*	*	*	490.4	473.7	500.6	494.4	412.2	405.7
	85+	*	*	*	*	*	*	415.9	384.2	422.8	396.9	355.9	349.7

Cervical	**65-74**	**	**	**	**	**	**	19.2	16.6	16.4	14.6	38.9	25.7
	75-84	**	**	**	**	**	**	21.7	15.1	18.2	12.0	60.7	36.8
	85+	**	**	**	**	**	**	17.2	13.9	14.6	10.6	45.4	47.3
Uterine	**65-74**	**	**	**	**	**	**	112.5	94.9	116.2	101.5	94.9	77.6
	75-84	**	**	**	**	**	**	104.4	99.9	104.8	106.2	111.9	75.5
	85+	**	**	**	**	**	**	67.8	68.0	67.0	70.1	76.9	67.1
Ovarian	**65-74**	**	**	**	**	**	**	61.8	52.1	63.0	56.0	56.6	42.2
	75-84	**	**	**	**	**	**	66.8	58.0	68.3	60.3	57.1	47.8
	85+	**	**	**	**	**	**	64.8	55.0	67.0	57.3	31.4	46.3
Prostate	**65-74**	1055.9	946.0	1004.0	914.4	1472.3	1,429.3	**	**	**	**	**	**
	75-84	1173.0	984.6	1125.2	923.8	1612.2	1,387.2	**	**	**	**	**	**
	85+	982.8	844.2	949.3	798.1	1310.2	1,120.7	**	**	**	**	**	**
Bladder	**65-74**	198.7	158.0	212.2	174.2	94.3	78.0	50.4	39.1	52.8	41.6	31.0	32.2
	75-84	294.5	246.8	307.0	268.1	165.8	125.7	77.8	60.5	80.8	63.7	52.4	50.8
	85+	386.6	295.3	409.5	319.9	158.3	150.9	83.2	75.0	84.2	76.8	73.4	78.4
Non-Hodgkin's Lymphoma	**65-74**	86.3	77.2	90.0	80.7	51.7	48.8	63.5	57.0	66.3	60.9	38.9	33.0
	75-84	122.2	115.9	126.4	121.0	56.7	59.6	97.9	82.7	101.4	86.5	46.4	43.1
	85+	134.8	117.7	139.3	122.0	87.9	58.2	93.6	78.8	96.3	81.6	52.4	36.9
Multiple Myeloma	**65-74**	28.7	28.3	26.3	27.2	51.7	49.3	20.2	19.9	17.4	18.0	43.2	46.6
	75-84	45.5	44.1	42.5	42.7	86.1	76.0	29.0	29.7	26.7	27.9	59.5	57.1
	85+	43.4	48.6	42.3	47.4	52.8	73.3	32.8	27.9	29.5	26.8	73.4	52.9
Leukemia	**65-74**	54.3	54.8	56.5	57.5	37.5	43.6	30.8	28.1	31.3	29.4	24.9	25.7
	75-84	83.7	87.7	85.7	92.9	67.2	60.1	50.8	46.7	51.5	48.8	47.6	35.1
	85+	117.6	115.6	121.1	123.2	70.4	77.6	68.1	66.8	69.3	68.3	48.9	59.5
Ill-Defined & Unspecified Site	**65-74**	61.5	53.0	59.8	53.8	79.3	59.0	48.6	41.2	48.4	41.6	51.1	49.6
	75-84	101.1	94.5	102.5	94.6	92.4	104.9	94.4	74.9	94.9	73.5	91.6	99.6
	85+	149.7	146.2	153.0	147.2	131.9	131.5	152.2	120.7	153.2	121.6	146.7	107.7

Age-specific rates per 100,000 pop.

** Non-Applicable Gender

^ Rates not calculated for fewer than five cases.

* Rates not calculated.

Table 2. Age-Specific Cancer Mortality Rates by Site, Race & Gender, NJ vs US, 1994-1998

Cancer Sites	Age Group	Male						Female					
		All Races		White		Black		All Races		White		Black	
		NJ	US	NJ	US	NJ	US	NJ	US	NJ	US	NJ	US
All Sites	**65-74**	1082.4	1075.5	1064.2	1053.2	1434.5	1456.3	727.8	684.6	730.3	683.9	835.8	788.8
	75-84	1897.2	1802.8	1885.1	1774.6	2374.3	2374.9	1185.1	1055.5	1196.0	1055.4	1197.1	1149.9
	85+	2943.2	2724.2	2974.3	2706.4	3030.8	3231.6	1607.8	1421.2	1614.7	1421.2	1670.4	1517.7
Oropharyngeal	**65-74**	18.5	18.7	^	^	^	^	6.1	7.1	^	^	^	^
	75-84	18.5	22.0	^	^	^	^	9.8	10.4	^	^	^	^
	85+	37.7	30.5	^	^	^	^	18.1	17.0	^	^	^	^
Stomach	**65-74**	36.5	28.0	33.6	24.9	68.0	55.1	14.8	12.2	13.4	10.6	26.2	23.5
	75-84	63.6	50.7	59.4	45.8	120.5	98.4	34.4	25.2	33.4	22.6	49.0	49.2
	85+	104.8	81.6	104.3	75.9	123.0	137.3	66.3	46.3	64.8	41.7	88.1	94.3
Colorectal	**65-74**	123.7	104.6	124.4	102.9	136.7	134.9	77.0	66.4	76.7	64.4	93.7	93.4
	75-84	233.1	190.5	236.3	189.2	234.7	229.7	160.3	134.8	160.2	132.7	181.6	173.1
	85+	387.3	329.0	396.7	331.7	342.6	344.4	302.2	262.2	303.3	261.6	324.2	288.8
Pancreatic	**65-74**	53.9	52.0	53.4	51.0	67.1	68.9	42.2	38.2	41.7	37.0	51.7	53.5
	75-84	88.7	82.5	90.2	81.2	82.5	105.1	77.6	69.1	77.1	67.2	89.6	95.5
	85+	116.7	108.9	118.0	108.6	114.2	117.8	101.6	97.4	103.6	95.3	84.6	129.3
Lung	**65-74**	378.6	409.9	372.1	405.3	510.1	522.8	198.4	204.8	200.4	209.6	218.5	196.7
	75-84	528.0	546.1	526.6	542.7	644.9	660.3	271.2	246.0	276.8	251.4	238.9	206.7
	85+	596.2	529.7	598.7	531.7	667.7	556.5	213.4	186.7	213.6	188.6	232.6	168.2
Melanoma of the Skin	**65-74**	15.4	13.4	^	^	^	^	7.0	5.7	^	^	^	^
	75-84	26.1	20.6	^	^	^	^	10.0	8.6	^	^	^	^
	85+	34.7	29.2	^	^	^	^	16.5	12.7	^	^	^	^
Breast (Female)	**65-74**	*	*	*	*	*	*	115.1	99.1	117.1	99.7	121.7	113.1
	75-84	*	*	*	*	*	*	162.8	138.1	164.6	138.9	168.5	151.1
	85+	*	*	*	*	*	*	241.3	199.8	242.6	201.4	257.3	206.7

Cervical	**65-74**	**	**	**	**	**	**	7.8	7.7	6.7	6.6	18.9	17.5
	75-84	**	**	**	**	**	**	9.6	9.0	8.2	7.8	27.5	22.6
	85+	**	**	**	**	**	**	10.5	11.8	8.8	10.0	31.7	32.5
Uterine	**65-74**	**	**	**	**	**	**	24.2	18.4	22.6	17.0	42.6	35.0
	75-84	**	**	**	**	**	**	36.6	27.4	36.0	26.2	51.4	44.4
	85+	**	**	**	**	**	**	34.9	36.9	34.8	36.1	42.3	50.9
Ovarian	**65-74**	**	**	**	**	**	**	39.7	37.3	41.2	38.4	34.7	33.4
	75-84	**	**	**	**	**	**	55.9	52.8	58.1	54.0	34.7	44.8
	85+	**	**	**	**	**	**	65.8	55.7	67.5	57.1	49.3	46.2
Prostate	**65-74**	105.5	103.9	92.4	92.4	257.5	248.2	**	**	**	**	**	**
	75-84	324.6	317.2	302.4	293.3	680.8	685.6	**	**	**	**	**	**
	85+	768.6	772.1	747.5	733.5	1168.4	1334.8	**	**	**	**	**	**
Bladder	**65-74**	30.9	26.0	31.7	27.1	30.2	19.0	9.7	7.9	10.1	7.8	7.9	10.8
	75-84	80.1	63.6	83.7	66.0	48.6	46.8	24.8	19.9	24.6	19.6	33.5	25.5
	85+	179.0	137.3	190.8	143.6	61.5	90.5	46.7	42.0	45.9	41.6	59.9	50.6
Non-Hodgkin's Lymphoma	**65-74**	39.5	39.4	42.2	41.4	17.6	24.0	28.7	27.7	30.6	29.3	18.9	16.5
	75-84	77.0	72.5	80.4	75.6	44.4	37.4	56.9	53.8	59.3	56.4	29.9	28.2
	85+	94.0	98.5	97.1	104.0	61.5	42.5	66.9	68.3	70.3	71.5	28.2	33.8
Multiple Myeloma	**65-74**	19.4	20.5	18.0	19.2	36.9	37.5	13.6	14.2	12.2	13.0	27.4	27.5
	75-84	37.5	36.2	36.1	34.5	63.4	64.4	23.5	24.7	21.7	23.1	49.0	46.7
	85+	46.7	50.4	43.3	47.7	87.9	86.6	31.2	28.4	27.5	26.6	84.6	53.5
Leukemia	**65-74**	39.1	37.2	40.6	38.1	31.0	32.9	19.9	19.4	20.5	19.9	16.4	17.7
	75-84	75.4	73.0	77.9	75.1	50.7	58.1	40.1	39.5	41.0	40.4	34.7	34.4
	85+	116.7	116.9	121.3	121.4	70.3	84.2	68.3	66.2	70.3	68.1	45.8	50.9
Ill-Defined & Unspecified Site	**65-74**	65.3	71.1	65.7	69.9	72.1	94.6	48.9	44.7	49.2	44.1	56.6	56.8
	75-84	118.7	115.9	120.4	115.6	109.9	134.1	89.6	81.2	90.7	80.4	84.8	97.3
	85+	189.8	174.4	196.1	175.5	149.4	179.8	149.5	135.3	150.7	135.1	144.5	149.4

Age-specific rates per 100,000 pop.

** Non-Applicable Gender

^ Rates not calculated for fewer than five cases.

* Rates not calculated.

DISCUSSION

As the population ages, larger numbers of older adults will develop cancer. Cancer patients age 65 years and older merit special attention as a group for research efforts in cancer prevention, screening, diagnosis and treatment.

As part of Healthy New Jersey 2010, some objectives were developed to target women age 65 and older. They include: 1) increasing the percent of breast cancer diagnosed at an early stage, and 2) increasing the percent of these women who receive breast exams and mammography screenings within the past two years. We see from the data an overall favorable staging pattern for breast cancer among older women which may be the result of effective screening. Most screening recommendations encourage mammography past the age of 70 for women in good health. However, the data show that older black women are lagging behind older white women in terms of early diagnosis and perhaps access to appropriate treatment. This was noted in our report, *Breast Cancer in New Jersey, 1979-1995.*

Another Healthy New Jersey 2010 objective for women age 65 and older is to increase the percent of women with an intact cervix who had a Pap test within the past 2 years. From the data we see an underutilization of appropriate screening for cervical cancer, demonstrated by an unfavorable staging pattern. Most screening recommendations end at age 65 if previous years' Pap tests were normal. Perhaps a change in this screening recommendation, to include women over the age 65, would improve prognosis for older women and especially older black women.

An unfavorable staging pattern for colorectal cancer is seen for both older men and women. Healthy New Jersey 2010 again targets older adults with the objective of increasing the percent of older adults who have received a fecal occult blood test or sigmoidoscopy within the past year. Better screening of older adults is needed to detect colorectal cancer at an earlier stage.

For both older men and women with melanoma of the skin a favorable staging pattern is evident, indicating that these lesions generally are being detected and treated early. For oropharyngeal cancer, older adults and especially men, may benefit from increased screening.

Among older men we see an overall favorable staging pattern for prostate cancer. National screening recommendations for prostate cancer are variable with no consensus on the effectiveness of the prostate-specific antigen (PSA) blood test or the digital rectal examination (DRE) beginning at age 50. Men, age 85 and older, may not be getting screened as frequently as men under age 85. The percent of unstaged prostate cancer cases is high for all age groups among older men.

As with the total adult population in New Jersey, older adults have higher overall incidence and mortality rates compared with the U.S. However, lower incidence rates are seen for leukemia, multiple myeloma and oropharyngeal cancers compared with the U.S.

Healthy New Jersey 2010 again targets adults aged 65 and older with objectives to reduce mortality from lung, colorectal, breast and cervical cancers. From the data, lower mortality rates are seen with lung, cervical, uterine, multiple myeloma and pancreatic cancers for various gender, race and age groups compared with the U.S. Lower overall mortality rates are also seen among older black men in New Jersey compared with the U.S.

Further research is needed to truly understand the problems and opportunities for improvement in diagnosis, treatment and support of older adults with cancer. Some potential research issues suggested by this report include:

1) the convergence of total cancer incidence rates for 65-74 year olds and 75-84 year olds in recent years;
2) the variation in cancer incidence patterns among older adults by age group, gender and race (highest rates seen for black men aged 75-84);
3) the variation in incidence patterns for lung cancer in older adults by age group and how it may relate to changes in smoking patterns or carcinogenesis;
4) the variation in mortality rates among black older adults and how it may relate to inconsistent application of, or access to, specialized treatments;
5) the higher percentage of oral cancers diagnosed at later stages in older adults and how it may relate to lack of screening by dentists.

In addition, other critical issues regarding older adults with cancer will require attention from the research community. These include:

- effective screening policies for adults age 65 and older,
- physician practice guidelines for adults age 65 and older,
- co-morbidities and other complicating factors that influence treatment approaches,
- variation in treatment patterns of older adults by age and race,
- role of palliation as more older adults are diagnosed with cancer,
- improved access to care for the older adult population in New Jersey,
- economic and social implications of the increased burden of cancer.

This report sheds light on many issues that warrant further study. Data from the New Jersey State Cancer Registry (NJSCR) may allow researchers to determine the feasibility of research studies and may provide more insight into cancer among older adults. To facilitate such research, the NJSCR has developed a *Researchers' Data Set* available to epidemiologists upon request (see technical notes).

TECHNICAL NOTES

REGISTRY OVERVIEW

The objectives of the New Jersey State Cancer Registry (NJSCR) are to:

* monitor cancer trends in New Jersey
* promote scientific research
* respond to New Jersey residents about cancer concerns
* educate the public
* provide information for planning and evaluating cancer prevention and control activities and
* share and compare cancer data with other states and the nation.

The New Jersey State Cancer Registry is a population-based incidence registry that serves the entire state of New Jersey, with a population of approximately 8.4 million people. The NJSCR was established by legislation (NJSA 26:2-104 et. seq.) and includes all cases of cancer diagnosed in New Jersey residents since October 1, 1978. New Jersey regulations (NJAC 8:57A) require the reporting of all newly diagnosed cancer cases to the NJSCR within three months of hospital discharge or six months of diagnosis, whichever is sooner. Reports are filed by hospitals, diagnosing physicians, dentists, and independent clinical laboratories. Every hospital in New Jersey is now reporting cancer cases electronically. In addition, reporting agreements are maintained with New York, Pennsylvania, Delaware, Florida, Maryland, and North Carolina so that New Jersey residents diagnosed with cancer outside the state can be identified. Legislation in 1996 strengthened the Registry by (1) requiring electronic reporting, (2) requiring abstracting by certified Tumor Registrars and (3) establishing penalties for late or incomplete reporting. Timely reporting of cancer data are required by law.

All primary invasive and *in situ* neoplasms are reportable to the NJSCR, except cervical cancer *in situ* diagnosed after 1994 and certain carcinomas of the skin. The information collected by the NJSCR includes basic patient identifiers, demographic characteristics of the patient, medical information on each cancer diagnosis (such as the anatomic site, histologic type and summary stage of disease), and vital status (alive or deceased) determined annually. For deceased cases, the underlying cause of death is also included. The primary site, behavior, grade, and histology of each cancer are coded according to the *International Classification of Disease for Oncology, 2nd edition*. The NJSCR follows the data standards promulgated by the North American Association of Central Cancer Registries (NAACCR), including the use of the Surveillance, Epidemiology, and End Results (SEER) multiple primary rules.

The NJSCR is a member of NAACCR, an organization that sets standards for cancer registries, facilitates data exchange, and publishes cancer data. The NJSCR been a participant of the National Program of Cancer Registries sponsored by the Centers for Disease Control and Prevention since it began in 1994 and is one of the National Cancer Institute's SEER expansion registries.

DATA SOURCES

NJ cancer incidence and mortality data were taken from the November 2000 analytic file and tabulated using SEER*Stat (http://seer.cancer.gov/ScientificSystems/SEERStat/), a statistical software package distributed by the National Cancer Institute. U.S. cancer incidence data were also obtained from the National Cancer Institute's SEER Program. U.S. mortality data were provided by the Centers for Disease Control and Prevention and tabulated in CDC Wonder, which is located online at http://wonder.cdc.gov. The 1979-1998 population estimates were provided by the U.S. Bureau of the Census.

For this report, rates were calculated for invasive cancers only with the exception of cancer of the bladder, for which *in situ* cases are included. The reason for excluding the *in situ* cases for most of the report is that data on cancer incidence for the U.S. do not include *in situ* cases or include *in situ* cases separately from the invasive cases. In the section on the stage at diagnosis, in situ stage cases are included. The NJSCR also follows the guidelines and standard practices of the SEER Program in determining multiple primary cancers for an individual. Following the SEER multiple primary rules, patients could be counted more than once if they were diagnosed with two or more primary cancers.

The NJSCR has recently developed a *Researchers' Data Set.* This individual-level data set, without identifiers, currently includes data from 1991-1998 and is available for distribution to epidemiologists on CD-ROM at http://www.state.nj.us/health/cancer/webroll.htm. While not sufficient in and of itself for in-depth epidemiological analysis, the *Researchers' Data Set* can provide investigators with the scope of years, diagnoses, age groups, counties, and other variables necessary for designing studies.

DATA QUALITY

In the years 1998, 1999, 2000 and 2001, NAACCR awarded the NJSCR the Gold Standard, the highest standard possible, for the quality of the 1995, 1996, 1997 and 1998 data. The criteria used to judge the quality of the data were completeness of cancer case ascertainment, completeness of certain information on the cancer cases, percent of death certificate only cases, percent of duplicate cases, passing an editing program, and timeliness. These same quality indicators applied to earlier NJSCR data also have demonstrated a high degree of accuracy and reliability of the data presented in this report.

While our estimates of completeness are very high, some cases of cancer among New Jersey residents who were diagnosed and/or treated in other states, may not yet have been reported to New Jersey by other state registries. This fact should be considered in interpreting the data for the more recent years. However, these relatively few cases will not significantly affect the cancer rates in these years, or alter the overall trends presented in this report.

CALCULATION OF RATES

A cancer incidence rate is defined as the number of new cases of cancer detected during a specified time period in a specific population. A cancer mortality rate is defined as the number of new cancer deaths detected during a specified time period in a specific population. These rates are most commonly expressed as cases per 100,000 population. All the incidence and mortality rates, except age-specific rates, were age-adjusted using the 1970 U.S. Standard Population. This allows comparisons among the rates by year, race, and geographic area. An explanation of why and how the incidence and mortality rates were age-adjusted follows:

Cancer occurs at different rates in different age groups, making age a very important risk factor for cancer. Therefore, incidence and mortality rates are frequently calculated separately for specific age groups. These rates are referred to as age-specific rates. The age specific rate for a time period of length *t* is calculated as follows:

$$r_a = \frac{n_a}{t \; x \; P_a}$$

where r_a = the age-specific rate for age-group *a*,
n_a = the number of events (cancer diagnoses or deaths, for example) in age-group a during the time period,
t = the length of time in years, and
P_a = average size of the population in age-group a during time t (mid-year population or average of the mid-year populations).

Multiplying r_a by 100,000 expresses the rate as the number of cases per 100,000 persons.

When comparing rates across different population subgroups, e.g. by race, or across different years, it is important to account for differences in age distributions. We calculate an age-adjusted rate using a weighted-average of the age-specific rates. This method of age adjustment is known as direct age-standardization. The age-adjusted rate is obtained by using the age distribution of a standard population as the weights:

$$R = \frac{\sum_{a=1}^{n} r_a \; x \; Std.P_a}{\sum_{a=1}^{n} Std.P_a}$$

where *R* = the age-adjusted rate,
r_a = the age-specific rate for age-group *a*, and
$Std.P_a$ = the number of people in age group *a* of the standard population.

Multiplying the age-adjusted rate by 100,000 expresses it as the number of cases per 100,000 persons.

The standard population used for age adjustment throughout this report is the 1970 U.S. Standard Population, the traditional standard population used in much of the published cancer incidence data. This will be changing with data from calendar year 1999 and forward. At that time, the U.S. Department of Health and Human Services will require health data to be age adjusted to the 2000 U.S. Standard Population.

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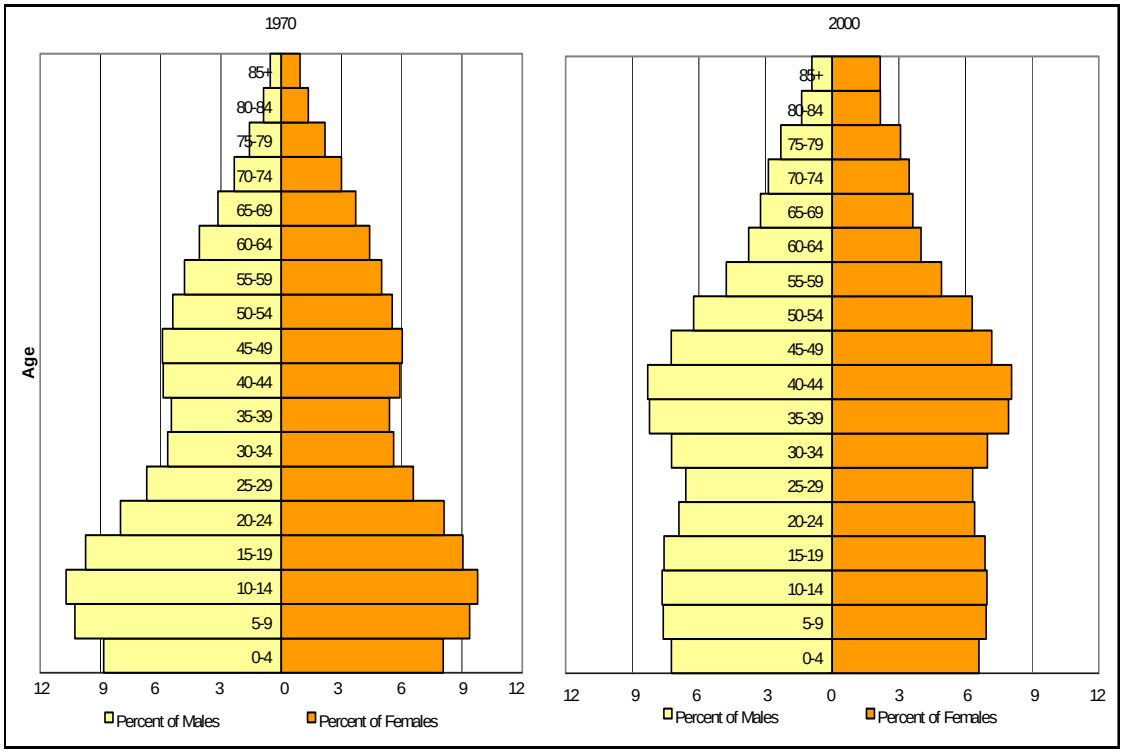
APPENDIX

DATA TABLES FOR FIGURES

Figure 1.
Population Pyramids for the 1970 and Estimated 2000 U.S. Populations



Source: U.S. Census Bureau

Table 1.
Number and Proportion of Total Cancer Cases by Gender and Age Group, NJ 1994-1998

	Males		Females	
Age Group	**Count**	**Percent**	**Count**	**Percent**
00-64	38,403	35.7%	43,412	41.6%
65-74	37,395	34.8%	27,217	26.1%
75-84	25,659	23.8%	24,359	23.4%
85+	6,164	5.7%	9,289	8.9%
Total	107,621	100.0%	104,277	100.0%

Average annual for 1994-1998.

Table 2. Age-Specific Total Cancer Incidence Rates by Age Group & Gender, NJ 1979-1998

DX YEAR	MALE			FEMALE		
	65-74	75-84	85+	65-74	75-84	85+
1979	2,357.7	3,646.0	4,397.1	1,391.3	1,900.2	2,026.1
1980	2,439.2	3,930.9	4,472.4	1,501.0	1,935.0	2,165.1
1981	2,369.2	3,880.9	4,468.4	1,515.9	2,045.4	2,251.7
1982	2,409.9	3,938.5	4,500.7	1,538.5	1,994.3	2,148.9
1983	2,436.9	4,056.1	4,701.7	1,516.4	1,994.2	2,169.7
1984	2,323.9	3,667.0	4,856.4	1,493.3	1,995.9	2,190.4
1985	2,311.4	3,659.8	4,183.9	1,519.0	1,952.1	2,120.5
1986	2,284.9	3,645.5	4,133.0	1,494.2	2,010.7	2,295.3
1987	2,321.3	3,718.5	4,093.1	1,565.7	2,020.3	2,155.4
1988	2,404.3	3,728.0	4,363.0	1,675.2	1,985.6	2,330.1
1989	2,440.7	3,632.8	4,547.5	1,631.6	2,093.5	2,371.5
1990	2,547.5	3,874.1	4,586.7	1,635.5	2,196.2	2,402.3
1991	2,887.5	4,138.3	4,938.6	1,631.6	2,157.2	2,341.5
1992	3,218.2	4,426.6	4,859.3	1,648.9	2,126.2	2,258.1
1993	2,992.5	4,111.0	4,686.0	1,637.8	2,113.2	2,301.8
1994	2,807.6	3,653.1	4,021.9	1,574.2	2,113.3	2,192.4
1995	2,846.1	3,619.0	3,558.1	1,603.9	2,097.6	2,165.8
1996	2,790.6	3,505.8	3,850.7	1,565.1	2,114.4	2,054.1
1997	2,886.7	3,614.0	3,635.2	1,664.5	2,107.4	2,244.8
1998	2,805.4	3,456.5	3,303.4	1,657.3	2,117.0	2,133.9

Rate per 100,000 pop.

Table 3. Age-Specific Total Cancer Mortality Rates by Age Group & Gender, NJ 1979-1998

DX YEAR	MALE			FEMALE		
	65-74	75-84	85+	65-74	75-84	85+
1979	1175.7	1986.5	2700.4	640.8	1018.5	1362.2
1980	1180.0	2022.6	2599.6	665.0	1030.9	1301.7
1981	1175.8	1972.8	2667.3	705.8	1063.5	1380.0
1982	1137.7	2056.4	2504.3	713.0	1048.7	1359.7
1983	1180.9	2048.7	2708.6	707.7	1066.4	1372.8
1984	1178.6	2041.0	2940.5	734.4	1033.8	1384.2
1985	1171.5	2075.6	2812.0	703.3	1069.6	1422.3
1986	1143.8	2046.3	2744.0	707.5	1062.2	1502.2
1987	1160.3	2079.0	2791.3	686.0	1080.7	1494.0
1988	1116.6	1972.0	2829.2	721.1	1083.1	1489.7
1989	1165.3	1970.9	3095.8	739.0	1128.9	1507.8
1990	1167.0	2089.1	3046.6	737.4	1129.1	1610.0
1991	1192.7	2043.2	3065.5	751.6	1204.4	1758.8
1992	1163.5	1928.5	3138.7	747.2	1183.0	1625.3
1993	1185.5	1996.2	3131.0	748.8	1193.7	1723.5
1994	1125.4	2027.9	3100.6	754.2	1180.8	1604.4
1995	1149.8	1923.4	3098.1	751.2	1217.3	1661.7
1996	1067.0	1961.6	2949.3	705.0	1180.3	1626.5
1997	1051.1	1796.8	2904.5	727.5	1176.3	1579.8
1998	1015.5	1794.9	2712.8	699.4	1171.9	1571.7

Rate per 100,000 pop.

Table 4. Age-Specific Cancer Incidence Rates and Counts by Site, Race & Gender, NJ, 1994-1998

Cancer Sites	Age Group	Male						Female					
		All Races		White		Black		All Races		White		Black	
		Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count
All Sites	65-74	2,827.2	37,395	2,780.5	32,556	3,290.0	3,944	1,612.3	27,217	1,637.4	24,238	1,500.4	2,467
	75-84	3,567.2	25,659	3,547.2	23,316	3,799.5	1,810	2,110.0	24,359	2,138.8	22,474	1,913.4	1,608
	85+	3,660.4	6,164	3,715.2	5,706	3,183.3	362	2,157.8	9,289	2,176.6	8,636	1,998.5	572
Oropharyngeal	65-74	57.2	756	^	^	^	^	23.5	396	^	^	^	^
	75-84	53.3	383	^	^	^	^	27.7	320	^	^	^	^
	85+	71.9	121	^	^	^	^	35.5	153	^	^	^	^
Stomach	65-74	61.1	808	58.7	687	85.1	102	25.7	433	23.8	352	35.3	58
	75-84	93.6	673	90.2	593	113.4	54	48.9	565	46.7	491	78.5	66
	85+	128.9	217	126.3	194	175.9	20	76.4	329	72.8	289	122.3	35
Colorectal	65-74	349.1	4,618	352.7	4,129	343.7	412	225.8	3,811	226.2	3,349	241.5	397
	75-84	527.0	3,791	535.4	3,519	468.1	223	389.2	4,493	394.6	4,146	353.4	297
	85+	636.6	1,072	665.4	1,022	343.0	39	509.9	2,195	517.2	2,052	450.7	129
Pancreatic	65-74	60.4	799	59.1	692	77.6	93	47.9	808	46.2	684	64.5	106
	75-84	83.4	600	86.1	566	54.6	26	79.4	917	79.5	835	83.3	70
	85+	100.4	169	100.3	154	131.9	15	101.3	436	103.1	409	83.9	24
Lung	65-74	479.0	6,335	475.4	5,566	573.1	687	259.2	4,375	264.1	3,909	257.9	424
	75-84	585.0	4,208	585.3	3,847	661.2	315	311.8	3,599	319.6	3,358	259.4	218
	85+	545.7	919	554.1	851	518.8	59	197.0	848	195.6	776	227.1	65
Melanoma of the Skin	65-74	67.5	895	73.1	858	*	*	31.3	529	33.3	495	*	*
	75-84	81.3	586	85.4	563	*	*	33.1	383	35.1	369	*	*
	85+	79.0	132	85.2	130	*	*	40.5	174	42.3	168	*	*
Breast (Female)	65-74	*	*	*	*	*	*	445.4	7,537	461.1	6,845	348.8	573
	75-84	*	*	*	*	*	*	490.4	5,667	500.6	5,269	412.2	345
	85+	*	*	*	*	*	*	415.9	1,789	422.8	1,678	355.9	101

Cervical	**65-74**	**	**	**	**	**	**	19.2	324	16.4	243	38.9	64
	75-84	**	**	**	**	**	**	21.7	250	18.2	191	60.7	51
	85+	**	**	**	**	**	**	17.2	74	14.6	58	45.4	13
Uterine	**65-74**	**	**	**	**	**	**	112.5	1,899	116.2	1,720	94.9	156
	75-84	**	**	**	**	**	**	104.4	1,205	104.8	1,101	111.9	94
	85+	**	**	**	**	**	**	67.8	292	67.0	266	76.9	22
Ovarian	**65-74**	**	**	**	**	**	**	61.8	1,043	63.0	932	56.6	93
	75-84	**	**	**	**	**	**	66.8	771	68.3	718	57.1	48
	85+	**	**	**	**	**	**	64.8	279	67.0	266	31.4	9
Prostate	**65-74**	1055.9	13,966	1004.0	11,755	1472.3	1,765	**	**	**	**	**	**
	75-84	1173.0	8,437	1125.2	7,396	1612.2	768	**	**	**	**	**	**
	85+	982.8	1,655	949.3	1,458	1310.2	149	**	**	**	**	**	**
Bladder	**65-74**	198.7	2,628	212.2	2,484	94.3	113	50.4	851	52.8	781	31.0	51
	75-84	294.5	2,118	307.0	2,018	165.8	79	77.8	898	80.8	849	52.4	44
	85+	386.6	651	409.5	629	158.3	18	83.2	358	84.2	334	73.4	21
Non-Hodgkin's Lymphoma	**65-74**	86.3	1,141	90.0	1,054	51.7	62	63.5	1,071	66.3	981	38.9	64
	75-84	122.2	879	126.4	831	56.7	27	97.9	1,130	101.4	1,065	46.4	39
	85+	134.8	227	139.3	214	87.9	10	93.6	403	96.3	382	52.4	15
Multiple Myeloma	**65-74**	28.7	380	26.3	308	51.7	62	20.2	341	17.4	257	43.2	71
	75-84	45.5	327	42.5	279	86.1	41	29.0	335	26.7	280	59.5	50
	85+	43.4	73	42.3	65	52.8	6	32.8	141	29.5	117	73.4	21
Leukemia	**65-74**	54.3	718	56.5	662	37.5	45	30.8	520	31.3	463	24.9	41
	75-84	83.7	602	85.7	563	67.2	32	50.8	586	51.5	541	47.6	40
	85+	117.6	198	121.1	186	70.4	8	68.1	293	69.3	275	48.9	14
Ill-Defined & Unspecified Site	**65-74**	61.5	813	59.8	700	79.3	95	48.6	821	48.4	716	51.1	84
	75-84	101.1	727	102.5	674	92.4	44	94.4	1,090	94.9	997	91.6	77
	85+	149.7	252	153.0	235	131.9	15	152.2	655	153.2	608	146.7	42

Age-Specific rates per 100,000 pop.

** Non-Applicable Gender

^ Rates not calculated for fewer than five cases.

* Rates not calculated.

Table 5. Age-Specific Cancer Mortality Rates and Counts by Site, Race & Gender, NJ, 1994-1998

Cancer Sites	Age Group	Male						Female					
		All Races		White		Black		All Races		White		Black	
		Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count
All Sites	65-74	1082.4	14,346	1064.2	12,497	1434.5	1,710	727.8	12,316	730.3	10,842	835.8	1,373
	75-84	1897.2	13,671	1885.1	12,432	2374.3	1,123	1185.1	13,696	1196.0	12,589	1197.1	1,002
	85+	2943.2	4,917	2974.3	4,536	3030.8	345	1607.8	6,917	1614.7	6,409	1670.4	474
Oropharyngeal	65-74	18.5	245	^	^	^	^	6.1	103	^	^	^	^
	75-84	18.5	133	^	^	^	^	9.8	113	^	^	^	^
	85+	37.7	63	^	^	^	^	18.1	78	^	^	^	^
Stomach	65-74	36.5	484	33.6	394	68.0	81	14.8	250	13.4	199	26.2	43
	75-84	63.6	458	59.4	392	120.5	57	34.4	398	33.4	351	49.0	41
	85+	104.8	175	104.3	159	123.0	14	66.3	285	64.8	257	88.1	25
Colorectal	65-74	123.7	1,639	124.4	1,461	136.7	163	77.0	1,303	76.7	1,139	93.7	154
	75-84	233.1	1,680	236.3	1,558	234.7	111	160.3	1,853	160.2	1,686	181.6	152
	85+	387.3	647	396.7	605	342.6	39	302.2	1,300	303.3	1,204	324.2	92
Pancreatic	65-74	53.9	714	53.4	627	67.1	80	42.2	714	41.7	619	51.7	85
	75-84	88.7	639	90.2	595	82.5	39	77.6	897	77.1	812	89.6	75
	85+	116.7	195	118.0	180	114.2	13	101.6	437	103.6	411	84.6	24
Lung	65-74	378.6	5,017	372.1	4,370	510.1	608	198.4	3,358	200.4	2,975	218.5	359
	75-84	528.0	3,805	526.6	3,473	644.9	305	271.2	3,134	276.8	2,914	238.9	200
	85+	596.2	996	598.7	913	667.7	76	213.4	918	213.6	848	232.6	66
Melanoma of the Skin	65-74	15.4	204	16.9	199	^	^	7.0	118	7.8	116	^	^
	75-84	26.1	188	28.1	185	^	^	10.0	116	10.9	115	^	^
	85+	34.7	58	37.4	57	^	^	16.5	71	0.4	69	^	^
Breast (Female)	65-74	*	*	*	*	*	*	115.1	1,948	117.1	1,738	121.7	200
	75-84	*	*	*	*	*	*	162.8	1,881	164.6	1,733	168.5	141
	85+	*	*	*	*	*	*	241.3	1,038	242.6	963	257.3	73

Cervical	**65-74**	**	**	**	**	**	**	7.8	132	6.7	99	18.9	31
	75-84	**	**	**	**	**	**	9.6	111	8.2	86	27.5	23
	85+	**	**	**	**	**	**	10.5	45	8.8	35	31.7	9
Uterine	**65-74**	**	**	**	**	**	**	24.2	409	22.6	335	42.6	70
	75-84	**	**	**	**	**	**	36.6	423	36.0	379	51.4	43
	85+	**	**	**	**	**	**	34.9	150	34.8	138	42.3	12
Ovarian	**65-74**	**	**	**	**	**	**	39.7	671	41.2	612	34.7	57
	75-84	**	**	**	**	**	**	55.9	646	58.1	612	34.7	29
	85+	**	**	**	**	**	**	65.8	283	67.5	268	49.3	14
Prostate	**65-74**	105.5	1,398	92.4	1,085	257.5	307	**	**	**	**	**	**
	75-84	324.6	2,339	302.4	1,994	680.8	322	**	**	**	**	**	**
	85+	768.6	1,284	747.5	1,140	1168.4	133	**	**	**	**	**	**
Bladder	**65-74**	30.9	410	31.7	372	30.2	36	9.7	164	10.1	150	7.9	13
	75-84	80.1	577	83.7	552	48.6	23	24.8	287	24.6	259	33.5	28
	85+	179.0	299	190.8	291	61.5	7	46.7	201	45.9	182	59.9	17
Non-Hodgkin's Lymphoma	**65-74**	39.5	523	42.2	496	17.6	21	28.7	486	30.6	454	18.9	31
	75-84	77.0	555	80.4	530	44.4	21	56.9	657	59.3	624	29.9	25
	85+	94.0	157	97.1	148	61.5	7	66.9	288	70.3	279	28.2	8
Multiple Myeloma	**65-74**	19.4	257	18.0	211	36.9	44	13.6	230	12.2	181	27.4	45
	75-84	37.5	270	36.1	238	63.4	30	23.5	272	21.7	228	49.0	41
	85+	46.7	78	43.3	66	87.9	10	31.2	134	27.5	109	84.6	24
Leukemia	**65-74**	39.1	518	40.6	477	31.0	37	19.9	336	20.5	304	16.4	27
	75-84	75.4	543	77.9	514	50.7	24	40.1	463	41.0	432	34.7	29
	85+	116.7	195	121.3	185	70.3	8	68.3	294	70.3	279	45.8	13
Ill-Defined & Unspecified Site	**65-74**	65.3	865	65.7	771	72.1	86	48.9	827	49.2	730	56.6	93
	75-84	118.7	855	120.4	794	109.9	52	89.6	1,035	90.7	955	84.8	71
	85+	189.8	317	196.1	299	149.4	17	149.5	643	150.7	598	144.5	41

Age-Specific rates per 100,000 pop.

** Non-Applicable Gender

^ Rates not calculated for fewer than five cases.

* Rates not calculated.

Table 6. Percent Distribution of Cancer at Stage of Diagnosis by Site, Race, Age Group & Gender, NJ 1994-1998

Cancer Site	Age Group	Whites				Blacks			
		InSitu&Local	Regional	Distant	Unstaged	InSitu&Local	Regional	Distant	Unstaged
Male Colorectal	65-74	40.1%	36.1%	15.0%	8.8%	39.7%	34.6%	18.3%	7.5%
	75-84	40.2%	33.5%	14.3%	12.0%	35.9%	35.9%	16.5%	11.7%
	85+	34.5%	34.5%	11.9%	19.0%	40.5%	31.0%	23.8%	4.8%
Female Colorectal	65-74	38.8%	37.4%	14.9%	8.9%	43.4%	34.3%	13.1%	9.1%
	75-84	37.2%	37.3%	14.5%	11.1%	31.0%	39.6%	19.5%	9.9%
	85+	32.5%	34.9%	12.0%	20.7%	25.0%	28.7%	23.5%	22.8%
Male Melanoma of the Skin	65-74	74.1%	5.1%	5.0%	15.7%	^	^	^	^
	75-84	73.9%	4.7%	5.5%	16.0%	^	^	^	^
	85+	73.6%	6.8%	3.1%	16.6%	^	^	^	^
Female Melanoma of the Skin	65-74	77.1%	4.5%	3.8%	14.6%	^	^	^	^
	75-84	72.8%	5.6%	5.2%	16.4%	^	^	^	^
	85+	67.8%	7.2%	5.3%	19.7%	^	^	^	^
Female Breast	65-74	67.9%	21.1%	4.9%	6.1%	61.0%	24.3%	8.1%	6.6%
	75-84	62.1%	20.4%	6.6%	10.9%	60.8%	23.7%	6.7%	8.8%
	85+	47.4%	22.4%	5.9%	24.3%	46.7%	28.0%	7.5%	17.8%
Cervix	65-74	35.4%*	42.4%	11.5%	10.7%	21.9%*	48.4%	10.9%	18.8%
	75-84	27.2%*	37.2%	15.2%	20.4%	25.5%*	49.0%	11.8%	13.7%
	85+	15.5%*	36.2%	17.2%	31.0%	23.1%*	23.1%	23.1%	30.8%
Prostate	65-74	71.8%	8.9%	3.3%	16.0%	68.5%	9.7%	7.8%	14.0%
	75-84	58.6%	4.7%	6.0%	30.7%	56.4%	5.9%	13.8%	23.9%
	85+	41.0%	5.4%	11.1%	42.5%	43.0%	4.0%	19.5%	33.6%
Cancer Site	Age Group	Males				Females			
		InSitu&Local	Regional	Distant	Unstaged	Insitu&Local	Regional	Distant	Unstaged
Oropharyngeal	65-74	32.8%	47.2%	7.7%	12.3%	40.2%	39.0%	8.6%	12.1%
	75-84	34.0%	42.3%	7.5%	16.2%	40.4%	32.7%	6.5%	20.4%
	85+	32.8%	32.8%	9.8%	24.6%	31.0%	36.7%	5.7%	26.6%

* Includes Local stage only. In Situ no longer collected ^ Rates not calculated